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(The items in this list were editorially compiled as an aid to FEDERAL REGISTER users. Inclusion or exclusion from this list has no legal significance. Since this list is intended as a reminder, it does not include effective dates that occur within 14 days of publication.)

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NOTE: There are no items eligible for inclusion in the list of RULES GOING INTO EFFECT.

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List of Public Laws

This is a listing of public bills enacted by Congress and approved by the President, together with the law number, the date of approval, and the U.S. Statute citation. The list is kept current in each issue of the Federal Register and copies of the laws may be obtained from the U.S. Government Printing Office.

H.R. 3109 .... Pub. Law 94–38

Saline water conversion program, appropriation authorization for fiscal year 1976

(June 19, 1975; 89 Stat. 217)

H.R. 4700 .... Pub. Law 94–39

National Aeronautics and Space Administration Authorization Act, 1976

(June 19, 1975; 89 Stat. 218)

S. 441 .... Pub. Law 94–40

Forest Pest Control Act, amendment

(June 20, 1975; 89 Stat. 224)

S. 818 .... Pub. Law 94–37

United Nations, peacekeeping forces in Middle East, authorization of United States payment for expenses

(June 19, 1975; 89 Stat. 216)

presidential documents

Title 3—The President

PROCLAMATION 4380

White Cane Safety Day, 1975

By the President of the United States of America

A Proclamation

The white cane is universally recognized as one of the simplest yet most effective aids to the independent mobility of the blind. Today, as blind persons are participating in the mainstream of active life, the white cane has also become a symbol of their capacity to contribute meaningfully to the progress of all Americans.

One of the most gratifying developments in our efforts to achieve better lives for all Americans is the advancement of social and economic opportunities for blind citizens. This growth is represented by the widening array of jobs capably handled by the blind. Well trained blind persons are working in nearly every trade, profession, and calling. Modern techniques of mobility and the increased use of the white cane have made this possible.

Still, as useful as the white cane is for helping the visually disabled person achieve self-reliance, it has its limitations. It cannot, for instance, warn of an approaching vehicle. Motorists and bicyclists should, therefore, be particularly alert for pedestrians using white canes and respond to their presence with an extra measure of care and caution.

In order that Americans may be made more fully aware of the significance of the white cane, and of the need for motorists and bicyclists to exercise caution and courtesy when approaching visually handicapped persons, the Congress, by joint resolution (78 Stat. 1003; 36 U.S.C. 169d), has authorized the President to proclaim October 15 of each year as White Cane Safety Day.

NOW, THEREFORE, I, GERALD R. FORD, President of the United States of America, do hereby proclaim Wednesday, October 15, 1975, as White Cane Safety Day. I call upon all Americans to exercise understanding and awareness of the special needs of our fellow citizens who are visually handicapped in order that they may enjoy the greatest possible measure of personal independence and safety as they use our streets and public facilities.

IN WITNESS WHEREOF, I have hereunto set my hand this twenty-third day of June, in the year of our Lord nineteen hundred seventy-five, and of the Independence of the United States of America the one hundred ninety-ninth.

Gerald R. Ford

[FR Doc.75-16702 Filed 6-23-75;3:41 pm]

rules and regulations

This section of the FEDERAL REGISTER contains regulatory documents having general applicability and legal effect most of which are keyed to and codified in the Code of Federal Regulations, which is published under 50 titles pursuant to 44 U.S.C. 1510.

The Code of Federal Regulations is sold by the Superintendent of Documents. Prices of new books are listed in the first FEDERAL REGISTER issue of each month.

Title 5—Administrative Personnel

CHAPTER I—CIVIL SERVICE COMMISSION

PART 213—EXCEPTED SERVICE

Department of Justice

Section 213.3310 is amended to show that one position of Director of Public Affairs, Drug Enforcement Administration, is excepted under Schedule C.

Effective on June 25, 1975, § 213.3310 (i) (3) is added as set out below:

§ 213.3310 Department of Justice.

* * * * *

(i) *Drug Enforcement Administration.* * * *

(3) Director of Public Affairs.

* * * * *

(5 U.S.C. 3301, 3302; EO 10577, 3 CFR 1954–58 Comp., p. 218)

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16680 Filed 6-24-75;8:45 am]

PART 213—EXCEPTED SERVICE

Department of Commerce

Section 213.3314 is amended to show that one position of Secretary and two positions of Confidential Assistant to the Special Assistant to the Secretary for Energy Policy are expected under Schedule C.

Effective on June 25, 1975, § 213.3314 (a) (32) and (33) are added as set out below.

§ 213.3314 Department of Commerce.

(a) *Office of the Secretary.* * * *

(32) One Secretary to the Special Assistant to the Secretary for Energy Policy.

(33) Two Confidential Assistants to the Special Assistant to the Secretary for Energy Policy.

* * * * *

(5 U.S.C. 3301, 3302; E.O. 10577, 3 CFR 1954–58 Comp., p. 218).

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16679 Filed 6-24-75;8:45 am]

PART 213—EXCEPTED SERVICE

Miscellaneous Revocations

Subpart C of Part 213 is amended to show that under the provisions of § 213.3101b, 186 positions are no longer excepted under Schedule C.

Effective on June 25, 1975, Subpart G of Part 213 is amended as set out below:

§ 213.3303 Executive Office of the President.

(a) *Office of Management and Budget.* * * *

(8) One Private Secretary to an Assistant Director.

* * * * *

(15) [Revoked]

* * * * *

(c) [Revoked]
(d) [Revoked]
(e) [Revoked]

* * * * *

(f) *President's Commission on White House Fellows.* * * *
(2) [Revoked]

* * * * *

(j) [Revoked]

* * * * *

§ 213.3304 Department of State.

(a) *Office of the Secretary.* * * *

(15) [Revoked]

* * * * *

(c) *Office of the Assistant Secretary for Congressional Relations.* (1) [Revoked]

* * * * *

(l) [Revoked]

* * * * *

(x) [Revoked]

* * * * *

§ 213.3305 Department of the Treasury.

(a) *Office of the Secretary.* * * *

(9) One Special Assistant to the Deputy Secretary.

* * * * *

(11) [Revoked]

* * * * *

(13) One Secretary to the Secretary.

* * * * *

(15) [Revoked]

* * * * *

(24) [Revoked]

* * * * *

(33) [Revoked]

* * * * *

(43) [Revoked]

* * * * *

(56) [Revoked]

* * * * *

(c) *Bureau of Customs.* * * *
(4) [Revoked]

* * * * *

(f) *Bureau of the Mint.* * * *
(3) [Revoked]

* * * * *

§ 213.3306 Department of Defense.

(a) *Office of the Secretary.* * * *
(4) [Revoked]

* * * * *

(6) One Private Secretary to the Defense Adviser to USNATO in Brussels, Belgium.

* * * * *

(13) [Revoked]

* * * * *

(33) [Revoked]

* * * * *

(39) [Revoked]

* * * * *

(41) [Revoked]

* * * * *

(46) [Revoked]

* * * * *

(55) [Revoked]

* * * * *

(b) *Court of Military Appeals.* (1) One Private Secretary to each of four Judges of the Court.

* * * * *

(e) *Defense Civil Preparedness Agency.* * * *

(3) [Revoked]

* * * * *

§ 213.3308 Department of the Navy.

(a) *Office of the Secretary.* * * *

(2) One Private Secretary to the Secretary and one Private or Confidential Secretary to the Under Secretary and to each Assistant Secretary of the Navy.

* * * * *

§ 213.3310 Department of Justice.

(a) *Office of the Attorney General.* (1) One Private Secretary to the Attorney General.

* * * * *

(5) Two Secretaries for the Attorney General.
(6) [Revoked]

* * * * *

(9) [Revoked]

* * * * *

(b) *Office of the Deputy Attorney General.* * * *
(7) [Revoked]

* * * * *

(e) *Civil Division.* (1) [Revoked]

* * * * *

(f) [Revoked]

* * * * *

(k) [Revoked]

* * * * *

(p) [Revoked]

* * * * *

(r) *Community Relations Service.* * * *

(5) One Special Assistant to the Director.

* * * * *

(s) *Law Enforcement Assistance Administration.* * * *
(2) [Revoked]

* * * * *

(8) [Revoked]

* * * * *

(10) [Revoked]

* * * * *

(u) *Office of National Narcotics Intelligence.* * * *
(2) [Revoked]

* * * * *

(v) [Revoked]

* * * * *

§ 213.3312 Department of the Interior.

(a) *Office of the Secretary.* * * *
(23) [Revoked]

* * * * *

(31) [Revoked]

* * * * *

(42) [Revoked]

* * * * *

(h) *National Park Service.* * * *
(5) [Revoked]

* * * * *

(k) *Southwestern Power Administration.* * * *
(4) [Revoked]

* * * * *

(m) *Bureau of Outdoor Recreation.* * * *

(4) [Revoked]

* * * * *

§ 213.3313 Department of Agriculture.

(a) *Office of the Secretary.* * * *
(25) [Revoked]
(26) [Revoked]

* * * * *

(36) [Revoked]

* * * * *

(c) *Office of the Under Secretary.* * * *

(7) Nine Federal Regional Council Representatives.

* * * * *

(m) *Agricultural Marketing Service.* * * *

(3) Two Confidential Assistants to the Administrator.

* * * * *

(q) *Food and Nutrition Service.* (1) Three Confidential Assistants to the Administrator.

* * * * *

§ 213.3314 Department of Commerce.

(a) *Office of the Secretary.* * * *

(3) One Confidential Assistant and one Private Secretary to the Under Secretary.

* * * * *

(12) [Revoked]

* * * * *

(16) [Revoked]

(17) Two Confidential Assistants to the Director, Office of Minority Business Enterprise.

* * * * *

(22) Two Confidential Assistants to the Special Assistants to the Secretary for Policy Development.

* * * * *

(27) [Revoked]

* * * * *

(30) [Revoked]

* * * * *

(h) [Revoked]

* * * * *

(l) *U.S. Travel Service.* (1) [Revoked]

* * * * *

(m) *Office of the Assistant Secretary for Domestic and International Business.* * * *
(10) One Confidential Assistant to the Director, Bureau of Competitive Assessment and Business Policy.

* * * * *

(q) *Office of the Assistant Secretary for Economic Development.* * * *
(11) [Revoked]

* * * * *

§ 213.3315 Department of Labor.

(a) *Office of the Secretary.* (1) One Special Assistant, one Confidential Assistant and two Staff Assistants to the Secretary of Labor.

* * * * *

(23) [Revoked]

* * * * *

(25) [Revoked]

* * * * *

(32) [Revoked]

* * * * *

§ 213.3316 Department of Health, Education, and Welfare.

(a) *Office of the Secretary.* * * *
(3) [Revoked]

* * * * *

(5) [Revoked]
(6) Three Confidential Assistants to the Under Secretary.

* * * * *

(11) Four Assistants to the Secretary for Special Programs.

* * * * *

(14) [Revoked]

* * * * *

(22) [Revoked]

* * * * *

(33) [Revoked]

* * * * *

(c) *Office of Education.* (1) [Revoked]

* * * * *

(8) [Revoked]

* * * * *

(f) *Office of the Assistant Secretary for Legislation.* * * *
(3) [Revoked]

* * * * *

(h) *Office of the Assistant Secretary for Health and Scientific Affairs.* * * *
(7) [Revoked]
(8) [Revoked]

* * * * *

(k) *Office of the Assistant Secretary for Planning and Evaluation.* (1) [Revoked]

* * * * *

(5) [Revoked]

* * * * *

(l) *Social Security Administration.* * * *
(3) [Revoked]

* * * * *

(m) *Office of Consumer Affairs.* * * *
(3) [Revoked]

* * * * *

(n) *Office of the Assistant Secretary for Human Development.* * * *
(9) [Revoked]

* * * * *

(13) [Revoked]

* * * * *

(o) *Social and Rehabilitation Service.* * * *

(3) One Confidential Assistant to the Administrator.

* * * * *

(6) [Revoked]

* * * * *

§ 213.3317 Overseas Private Investment Corporation.

* * * * *

(b) [Revoked]

* * * * *

§ 213.3318 Environmental Protection Agency.

(a) *Office of the Administrator.* * * *
(4) One Staff Assistant to the Administrator.

* * * * *

(10) [Revoked]

* * * * *

(b) *Office of Legislation.* * * *
(3) One Staff Assistant to the Director.

* * * * *

(d) *Office of the Assistant Administrator for Enforcement.* * * *
(2) [Revoked]

* * * * *

(f) [Revoked]

* * * * *

§ 213.3326 [Revoked]

* * * * *

§ 213.3328 U.S. Information Agency.

* * * * *

(i) [Revoked]
(j) [Revoked]
(k) [Revoked]

* * * * *

§ 213.3329 Federal Power Commission.

* * * * *

(e) One Private Secretary to the Executive Director.

* * * * *

(l) [Revoked]

* * * * *

§ 213.3332 Small Business Administration.

* * * * *

(e) Two Congressional Relations Officers.

* * * * *

(k) [Revoked]

* * * * *

(v) [Revoked]

* * * * *

§ 213.3337 General Services Administration.

(a) *Office of the Administrator.* * * *

(6) Three Confidential Assistants to the Administrator.

* * * * *

(b) *Public Buildings Service.* * * *

(2) Three Confidential Assistants to the Commissioner.

* * * * *

(f) *Property Management and Disposal Service.* * * *

(3) [Revoked]

* * * * *

(g) [Revoked]

* * * * *

§ 213.3340 Civil Aeronautics Board.

* * * * *

(d) [Revoked]

(e) [Revoked]

* * * * *

§ 213.3341 National Labor Relations Board.

* * * * *

(h) [Revoked]

* * * * *

§ 213.3342 Export-Import Bank of the United States.

* * * * *

(e) [Revoked]

* * * * *

§ 213.3344 Occupational Safety and Health Review Commission.

* * * * *

(d) [Revoked]

* * * * *

§ 213.3346 Selective Service System.

* * * * *

(b) [Revoked]

* * * * *

§ 213.3348 National Aeronautics and Space Administration.

* * * * *

(k) [Revoked]

(l) [Revoked]

* * * * *

§ 213.3355 The Renegotiation Board.

* * * * *

(c) One Secretary to each of three Board Members.

* * * * *

§ 213.3359 ACTION.

(a) Two Special Assistants to the Associate Director for Domestic and Anti-Poverty Operations.

* * * * *

(e) [Revoked]

(f) [Revoked]

* * * * *

(h) [Revoked]

(i) [Revoked]

* * * * *

(n) [Revoked]

* * * * *

§ 213.3360 Consumer Product Safety Commission.

(a) One Secretary (Stenography) to one Commissioner and one Staff Assistant to one Commissioner.

* * * * *

§ 213.3367 Federal Maritime Commission.

(a) One Confidential Assistant to each of two Commissioners.

(b) One Administrative Assistant to the Chairman, one Private Secretary to each Commissioner and one Private Secretary to the Managing Director.

* * * * *

§ 213.3376 Appalachian Regional Commission.

(a) One Special Assistant to the Federal Cochairman.

* * * * *

§ 213.3377 Equal Employment Opportunity Commission.

(a) Three Special Assistants to the Chairman.

* * * * *

(e) [Revoked]

* * * * *

§ 213.3382 National Foundation on the Arts and Humanities.

* * * * *

(c) [Revoked]

(d) [Revoked]

* * * * *

(f) [Revoked]

* * * * *

§ 213.3384 Department of Housing and Urban Development.

(a) *Office of the Secretary.* * * *

(19) One Special Assistant to the General Counsel.

* * * * *

(26) Three Senior Assistants for Legislative Affairs.

* * * * *

(42) [Revoked]

* * * * *

(48) [Revoked]

* * * * *

(50) [Revoked]

* * * * *

(52) [Revoked]

* * * * *

(b) *Office of the Assistant Secretary for Housing Production and Mortgage Credit-Federal Housing Administration Commissioner.* * * *

(3) [Revoked]

* * * * *

(13) [Revoked]

* * * * *

(f) *Office of the Assistant Secretary for Equal Opportunity.* (1) [Revoked]

(2) [Revoked]

* * * * *

(5) One Confidential Assistant to the Assistant Secretary.

* * * * *

(g) *Office of the Assistant Secretary for Research and Technology.* * * *

(2) [Revoked]

* * * * *

(i) *Office of the Assistant Secretary for Policy Development and Research.* * * *

(3) [Revoked]

* * * * *

§ 213.3386 Regional Commissions, Public Works and Economic Development Act of 1965.

(a) One Special Assistant to the Federal Cochairman of each Regional Commission (except for the New England Regional Commission) established under the Public Works and Economic Development Act of 1965.

(b) One Special Assistant to the Alternate Federal Cochairman of each Regional Commission (except New England Regional Commission) established under the Public Works and Economic Development Act of 1965.

(c) One Private Secretary to the Federal Cochairman of each Regional Commission (except for the Old West Regional Commission) established under the Public Works and Economic Development Act of 1965.

(d) One Private Secretary to the Alternate Federal Cochairman of each Regional Commission (except for the Four Corners Regional Commission and the Ozarks Regional Commission) established under the Public Works and Economic Development Act of 1965.

* * * * *

§ 213.3388 Federal Energy Administration.

* * * * *

(e) *Office of the General Counsel.* (1) [Revoked]

* * * * *

§ 213.3394 Department of Transportation.

(a) *Office of the Secretary.* * * *

(15) [Revoked]

* * * * *

(19) [Revoked]

* * * * *

(39) [Revoked]

(40) [Revoked]

* * * * *

(e) *Federal Railroad Administration.* * * *

(8) [Revoked]

* * * * *

§ 213.3399 Temporary Boards and Commissions.

(a) [Revoked]

* * * * *

(5 U.S.C. 3301, 3302; EO 10577, 3 CFR 1954–58 Comp., p. 218)

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16535 Filed 6-24-75;8:45 am]

PART 213—EXCEPTED SERVICE

Department of Labor

Section 213.3315 is amended to show that the positions of Executive Director of the Pension Benefit Guaranty Corporation and Administrator for Pension and Welfare Benefits, Labor Management Services Administration are excepted under Schedule C.

Effective on June 25, 1975, § 213.3315 (a)(40) and (41) are added as set out below.

§ 213.3315 Department of Labor.

(a) *Office of the Secretary.* * * *

(40) Executive Director of the Pension Benefit Guaranty Corporation.

(41) Administrator for Pension and Welfare Benefits, Labor Management Services Administration.

* * * * *

(5 U.S.C. 3301, 3302, E.O. 10577; 3 CFR 1954–58 Comp., p. 218)

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16534 Filed 6-24-75;8:45 am]

Title 7—Agriculture

CHAPTER IX—AGRICULTURAL MARKETING SERVICE (MARKETING AGREEMENTS AND ORDERS; FRUITS, VEGETABLES, NUTS), DEPARTMENT OF AGRICULTURE

PART 951—HANDLING OF IRISH POTATOES GROWN IN MASSACHUSETTS, RHODE ISLAND, CONNECTICUT, NEW HAMPSHIRE AND VERMONT

Termination

This document terminates Marketing Order No. 951 (7 CFR Part 951) regulating the handling of Irish potatoes grown in Massachusetts, Rhode Island, Connecticut, New Hampshire and Vermont, hereinafter referred to as "order," effective under the applicable provisions of the Agricultural Marketing Agreement Act of 1937, as amended (7 U.S.C. 601–674).

Notice of rulemaking with respect to proposed termination of the order was published in the April 17, 1975, FEDERAL REGISTER (40 FR 17151). Copies of this notice were sent with letters to the 227 handlers who paid assessments during the 1950–51 season as well as to the Commissioners of Agriculture and various potato associations in the production area States. The letters explained the proposed termination and requirements for requesting a refund. Many of the handler letters were returned with postal notations that the addressee was either deceased or unknown, or had moved and left no forwarding address. The notice provided that all written data, views, or arguments in connection with the proposed termination or any claim for a refund be submitted by May 21, 1975. Views were filed by Howard C. Townsend, New Hampshire Commissioner of Agriculture, favoring the plan to terminate the order. None was submitted in opposition to its termination. Also requests for refunds were submitted by four handlers.

The program has been inactive since the 1952 season when the last administrative committee was appointed and the last handling regulation was issued. Significant changes, such as State potato acreage declines up to 80 percent, have taken place within the production area during the two decades of inactivity which would prevent effective program operation without extensive revision of the order. With no reported producer interest in discussing reactivation of the order, there is little likelihood of successfully completing the necessary amendatory proceedings.

The committee's assets consist of approximately $5,427. This includes unexpended assessment income in excess of expenses accrued during the 1950–51 season plus subsequent interest. An appropriate disposition of the funds would be to pay the $43.39 in refunds requested by the four handlers' and to turn the remaining funds over to the land grant universities in the production area for research on potatoes, based on the handlers' payments in each State relative to the committee's total assets.

FINDINGS AND ORDER

After consideration of all relevant matters presented, including the proposal set forth in the aforesaid notice, and the views expressed by the New Hampshire Commissioner of Agriculture, pursuant to section 8c(16)(A) of the act (7 U.S.C. 608c(16)(A)) and § 951.84(b) of the order it is hereby found that the order no longer tends to effectuate the declared policy of the act and should be terminated. It is also found that the New England Potato Committee should be terminated and the above-indicated funds should be distributed as proposed in the notice.

It is therefore, ordered, That (1) Marketing Order No. 951 (7 CFR Part 951) is hereby terminated, (2) the New England Potato Committee is hereby terminated, (3) Myron A. Malewski, Whately, Massachusetts, the latest committee treasurer and the person the committee recommended as the trustee and Roland L. Powers, Marketing Specialist, Fruit and Vegetable Division, AMS, are hereby appointed trustees for the purpose of liquidating the affairs of the committee, and (4) the New England Potato Committee's assets consisting of approximately $5,427 in unexpended assessment funds and interest are hereby directed to be disbursed to (1) the four handlers who requested refunds of the amount due them and (2) the remainder for potato research to the Directors of Experiment Stations of the land grant universities as follows:

College of Agriculture and Natural Resources
University of Connecticut
Storrs, Connecticut 06268—$2,307.46;

College of Food and Natural Resources
University of Massachusetts
Amherst, Massachusetts 01002—$1,515.55;

The Colleges of Resource Development and Home Economics
University of Rhode Island
Kingston, Rhode Island 02881—$570.63;

College of Life Sciences and Agriculture
University of New Hampshire
Durham, New Hampshire 03824—$490.83;

The College of Agriculture
University of Vermont
Burlington, Vermont 05401—$499.39

(Secs. 1–19, 48 Stat. 31, as amended; 7 U.S.C. 601–674)

Dated June 20, 1975 to become effective July 31, 1975.

RICHARD L. FELTNER,
Assistant Secretary.

[FR Doc.75-16564 Filed 6-24-75;8:45 am]

Title 12—Banks and Banking

CHAPTER V—FEDERAL HOME LOAN BANK BOARD

SUBCHAPTER B—FEDERAL HOME LOAN BANK SYSTEM

[No. 75-535]

PART 523—MEMBERS OF BANKS

Liquid Assets; Correction

JUNE 19, 1975.

The Federal Home Loan Bank Board hereby corrects FEDERAL REGISTER Document No. 75-375, which amended § 523.-10 of the rules and regulations for the Federal Home Loan Bank System (12 CFR 523.10), published in the issue dated May 28, 1975, at 40 FR 23069, to set forth § 523.10(g)(4) as thereby amended to read as follows:

§ 523.10 Definitions.

* * * * *

(g) The term "liquid assets" means the total of cash, accrued interest on unpledged assets which qualify as liquid assets under this paragraph, or would so qualify except for their maturities, and the book value of the following unpledged assets (including such assets held subject to a repurchase agreement):

* * * * *

(4) Time deposits in an insured bank including such time deposits held subject to a repurchase agreement and loans of unsecured day(s) funds (Federal funds or similar unsecured loans to insured banks) to an insured bank, if:

(i) The total of all time deposits, including loans of unsecured day(s) funds of the same member, in the same bank does not exceed the greater of (a) one-fourth of 1 percent of the total deposits of such bank (calculated on the basis of total deposits of such bank as shown by its last published statement of condition preceding the date each time deposit is made or acquired by a member), or (b) $40,000;

(ii) No consideration, other than discounting to a current market rate of interest, is received by the member from a third party in connection with the making or acquiring of such deposits (excluding loans of unsecured day(s) funds) by the member and no consideration is received by the member from a third party in connection with loans of unsecured day(s) funds by the member;

(iii) Except for loans of unsecured day(s) funds, the remaining periods to maturity of such deposits are not more than 1 year and such deposits are negotiable, or, in the case of time deposits which may not be withdrawn without notice, the notice periods do not exceed 90 days;

(iv) The periods to maturity of loans of unsecured day(s) funds are not more than 6 months; and

(v) The claims of a lender of such unsecured day(s) funds are not subordinated in priority to claims of depositors in the insured bank to which such funds are loaned;

* * * * *

(Sec. 5A, 47 Stat. 727, as added by Sec. 1, 64 Stat. 256, as amended, Sec. 17, 47 Stat. 736, as amended; 12 U.S.C. 1425a, 1437, Reorg. Plan No. 3 of 1947, 12 FR 4981, 3 CFR, 1943–48, Comp., p. 1071).

By the Federal Home Loan Bank Board.

[SEAL] GRENVILLE L. MILLARD, Jr.,
Assistant Secretary.

[FR Doc.75-16536 Filed 6-24-75;8:45 am]

Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

[Airspace Docket No. 75-EA-44]

PART 71—DESIGNATION OF FEDERAL AIRWAYS, AREA LOW ROUTES, CONTROLLED AIRSPACE AND REPORTING POINTS

Alteration of Transition Area

The Federal Aviation Administration published a rule (Docket 74-EA-20) which altered the New York, N.Y., transition area (40 FR 554), effective September 12, 1974.

A review of the description discloses that a set of coordinates as they appear in the description are obviously in error by one degree. A correction of these coordinates, in view of the foregoing, will not impose any additional burden on any person and therefore notice and public procedure hereon are unnecessary and the correction may be made effective in less than 30 days. In view of the foregoing, Part 71 of the Federal Aviation Regulations is amended as follows: The description of the transition area is amended so as to change the coordinates *41*°17′30″ N., 73°54′45″ W., so as to read 40°17′30″ N., 73°54′45″ W., effective on June 25, 1975.

(Sec. 307(a), Federal Aviation Act of 1958, (72 Stat. 749; 49 U.S.C. 1348), sec. 6(c), Department of Transportation Act, (49 U.S.C. 1655(c)).)

Issued in Jamaica, N.Y., on June 13, 1975.

BRIAN J. VINCENT,
Acting Director, Eastern Region.

[FR Doc.75-16445 Filed 6-24-75;8:45 am]

[Docket No. 14580, Amdt. 103-25]

PART 103—TRANSPORTATION OF DANGEROUS ARTICLES AND MAGNETIZED MATERIALS

Extension of Compliance Date for Radiation Monitoring

The purpose of this amendment to §§ 103.3(d)(3) and 103.23(c) of the Federal Aviation Regulations is to extend the compliance date for the monitoring of any package containing radioactive materials prior to acceptance of these materials for carriage by air and after the removal of any package containing radioactive materials from an aircraft; and, for scanning the compartment from which a package containing radioactive materials has been removed, when appropriate.

Among the measures for inspection of dangerous articles set forth in Amendment 103-23 (40 FR 5140; published February 4, 1975), is the requirement that, after June 30, 1975, no person may accept any package containing radioactive materials for shipment in an aircraft unless a scan with a radiation monitoring instrument reveals that the level of radiation at 3 feet from the package does not exceed certain standards set forth in § 103.23(d). In the event that the scan of any package that has been removed from an aircraft discloses any leakage or increase in the level of radiation, certain parts of the aircraft are required to be scanned with a radiation monitoring instrument. The scan that is required must be performed using a radiation monitoring instrument with an accuracy of plus or minus 20 percent.

Numerous petitioners requested an extension of the compliance date for that portion of Amendment 103-23 that requires radiation monitoring. The most frequent reason cited for the requests to delay implementation was that the specifications for the radiation monitoring instrument that is needed to perform the required scanning are not clear. Furthermore, petitioners stated that, when definitive specifications are arrived at, manufacturers will need time to increase their supplies of the proper equipment and operators will need additional time to train personnel in its use.

FAA review of the petitions received does indicate that further definitive specifications for a radiation monitoring instrument suitable for performing the scanning that is required by Amendment 103-23 are needed. Accordingly, the FAA has instituted a study to develop more realistic specifications for radiation monitoring equipment. We also believe that additional time is necessary to produce the number of radiation monitoring instruments that are necessary to perform the monitoring of the packages of radioactive materials that are being transported by air, and to train personnel in their proper use.

In view of the imminence of the present compliance date, and since this amendment grants relief and imposes no additional burden on any person, I find that notice and public procedure thereon are impracticable and that good cause exists for making this amendment effective on less than 30 days notice.

This amendment is issued under the authority of sections 313(a) and 601 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a) and 1421), and authority delegated to the Administrator by the Secretary of Transportation (40 FR 2861).

In consideration of the foregoing, §§ 103.3(d)(3) and 103.23(c) of the Federal Aviation Regulations are amended, effective June 30, 1975, by deleting the phrase "June 30, 1975" and substituting the phrase "January 1, 1976" therefor.

Issued in Washington, D.C., on June 20, 1975.

JAMES E. DOW,
Acting Administrator.

[FR Doc.75-16676 Filed 6-24-75;8:45 am]

Title 20—Employees' Benefits

CHAPTER II—RAILROAD RETIREMENT BOARD

PART 395—PLAN OF OPERATION DURING A NATIONAL EMERGENCY

Administrative Reorganization; Changes

This document provides revisions of the Board's regulations, due to administrative reorganization, which delete references to offices which no longer exist and change the titles of organizational units.

Pursuant to the general authority provided by section 7 of the act of October 16, 1974 (88 Stat. 1338; 45 U.S.C. 231f) and by section 12 of the act of June 25, 1938 (52 Stat. 1107, as amended; 45 U.S.C. 362), §§ 395.4, 395.5(b) (2) and (3), 395.6(b) (2) and (3), 395.6(c)(4), 395.7 (a)(2) and (b)(2) of Part 395 (20 CFR 395.4, 395.5(b) (2) and (3), 395.6(b) (2) and (3), 395.6(c)(4), 395.7 (a)(2) and (b)(2)) of the regulations under such acts are amended by Board Order 75-52, dated June 9, 1975, as follows:

§ 395.4 Mailing instructions.

In a national emergency as defined in § 395.2, all mail shall be directed to Board offices at their normal locations. Through pre-positioned registration information with the Registration and Information facilities of the United States Postal Service, mail will be redirected automatically to the Board's relocation site if offices at normal locations become inoperative.

§ 395.5 Organization and functions of the Board, delegations of authority, and lines of succession.

* * * * *

(b) * * *

(2) In the absence or incapacity of the Chairman of the Board, the authority of the Chairman to act for the Board shall pass to the available successor highest on the following list:

Labor Member of the Board
Management Member of the Board
Chief Executive Officer
Director of Retirement Claims
Director of Unemployment and Sickness Insurance
Director of Data Processing and Accounts
Director of Budget and Fiscal Operations
Director of Management Control

The Regional Director highest on the following list:

Kansas City
Cleveland
Atlanta
New York
San Francisco

(3) Except as may be determined otherwise by the Chairman of the Board or his successor and as provided in §§ 395.6 and 395.7, the duties of each bureau head or regional director shall be discharged in his absence or incapacity during a national emergency by the available staff member next in line of succession. Each bureau head and each regional director shall designate and preposition the line of succession within his bureau or region. If no such designation has been made, such duties shall be assumed by the available subordinate who is highest in grade or, if there is more than one, in length of Board service.

§ 395.6 Personnel, fiscal, and service functions.

(b) * * *

(2) In a national emergency, incumbents of the following positions are hereby authorized to appoint emergency certifying officers:

Chief Executive Officer
Director of Budget and Fiscal Operations
Director of Retirement Claims
Director of Unemployment and Sickness Insurance
Regional Directors, or
Deputy Regional Directors.

* * * * *

(3) In a national emergency, incumbents of the following positions are designated as emergency cashiers and are authorized to receive and disburse cash for emergency administrative needs of the Board:

Cashiers	*Alternates*
Chairman of the Board.	Washington Liaison Officer.
Management Member of the Board.	Labor Member of the Board. Director of Budget and Fiscal Operations.
Chief Executive Officer.	None.
Regional Director:	
Atlanta	Deputy Regional Director and nearby official.
New York	Do.
Cleveland	Do.
Kansas City	Do.
San Francisco	Do.
District Manager:	
Seattle	Occupant of Position No. 7530-04.

* * * * *

(c) * * *

(4) As soon after the period of national emergency as conditions permit, the records required by subparagraph (3) of this paragraph shall be transmitted to the Director of Supply and Service or his surviving successor.

§ 395.7 Operating regulations.

(a) * * *

(2) To provide the necessary authority for a decentralized program as outlined in this paragraph (a), those authorities which have been delegated to the Director of Retirement Claims are hereby delegated to the regional directors or their surviving successors.

(b) * * *

(2) To provide the necessary authority for a decentralized program as outlined in this paragraph (b), the authorities which have been delegated to the Director of Unemployment and Sickness Insurance and to the regional directors are hereby delegated to the district managers or to their surviving successors.

By Authority of the Board.

Dated: June 18, 1975.

[SEAL] R. F. BUTLER,
Secretary of the Board.

[FR Doc.75-16488 Filed 6-24-75;8:45 am]

Title 21—Food and Drugs

CHAPTER I—FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

SUBCHAPTER B—FOOD AND FOOD PRODUCTS

[Docket No. 75G-0116]

PART 121—FOOD ADDITIVES

Food-Grade Salt by the Electrolytic Diaphragm Process; Order Staying Effective Date and Ruling on Objections

The Commissioner of Food and Drugs is staying the effective date (September 23, 1974) of § 121.1261 *Electrolytic diaphragm process for salt* (21 CFR 121.1261).

The Commissioner, in the FEDERAL REGISTER of September 23, 1974 (39 FR 34192), issued a regulation permitting the production of food grade salt by the electrolytic diaphragm process. Within the 30-day objection period provided for in the order, the Salt Institute (hereinafter call the Institute) filed objections to the regulation and requested a hearing based on these objections. The Institute later requested a stay of the effective date of the regulation. After the 30-day objection period had expired, the Maryland Public Interest Research Group submitted an objection and request that the regulation be withdrawn. Their submittal is rejected as untimely.

The Institute's objections were based on an allegation that the public had been deprived of its right to comment on the petition because the petitioner filed only for affirmation of generally recognized as safe (GRAS) status, published in the FEDERAL REGISTER of June 12, 1973 (38 FR 15471), and subsequently was granted a food additive regulation (21 CFR 121.1261). The Institute also alleged that the permitted alkalinity of salt produced by this process (0.65 percent as sodium hydroxide) may be detrimental to health and contended that the regulation would permit the marketing of food grade salt that is contaminated with asbestos fibers.

The Commissioner concludes that this regulation was properly promulgated in accordance with section 409 of the act and §§ 121.40 and 121.41 (21 CFR 121.40, 121.41), and that the Institute's legal objections are without merit. The procedures governing affirmation of GRAS status and determination of food additive status are set forth in §§ 121.40 and 121.41. The regulations explicitly provide that, after publication of a notice of a GRAS affirmation petition in the FEDERAL REGISTER, any interested person may comment on it. Thereafter, depending upon the information in the petition, comments received, other information available to the Food and Drug Administration (FDA), and the Commissioner's evaluation of the matter, the Commissioner may affirm GRAS status, promulgate a food additive regulation, promulgate an interim food additive regulation, or require discontinuation of the substance's use. This procedure provides for, in sequence, a proposal, comments on the proposal, and a final order. Neither the Administrative Procedure Act nor the Federal Food, Drug, and Cosmetic Act requires that additional or different procedures be utilized. The Commissioner notes that the Salt Institute did not file comments objecting to these procedures when they were proposed in the FEDERAL REGISTER of March 25, 1972 (37 FR 6207).

Although the Commissioner, when promulgating this regulation, considered the possible toxicity of additional alkalinity, he later became concerned that salt containing asbestos might be produced by the electrolytic diaphragm process. This concern was expressed to the petitioner, and the company that was represented by the petitioner was requested to submit a sample of this salt to the FDA.

A representative "pilot scale" sample of the salt in question was submitted to the FDA and was analyzed by one optical and two electron microscopic techniques. The sample was also analyzed by comparing the levels of asbestos found in it with levels present in unidentified samples of chemical reagent grade salt and food grade table salt (purchased from a local Washington, DC supermarket). While one of the electron microscopic techniques and the optical method did not identify asbestos fibers in either the reagent or the food-grade salt, the equivalent of 221 chrysotile asbesto fibers (up to 0.8 millimeter long) was found in 25 grams of the subject salt (the "pilot scale" sample) by optical microscopy; and the equivalent of approximately 16 million chrysotile asbestos fibers (averaging 3.7 microns long, 0.06 micron in diameter, and equivalent to 0.44 part per million asbestos by weight) was found per gram of the same salt by electron microscopy. The third analysis, with higher resolution electron microscopy, found chrysotile asbestos fibers in all three samples. These levels were equivalent to 200,000 fibers (1.0 micron average length) per gram of the chemical reagent grade salt, 80,000 fibers (1.0 micron average length) per gram of the food grade table salt, and 84 million fibers (1.7 microns average length) per gram of the subject salt. Details of the results of these analyses are on display in the office of the Hearing Clerk, Food and Drug Administration, Rm 4-65, 5600 Fishers Lane, Rockville, Md 20852.

Based on these analyses, the Commissioner concludes that the effective date of § 121.1261 should be stayed and the regulation revoked. Stay of this regulation is applicable to all persons, not just to petitioner or the persons represented by him, and will be in effect until all material issues on the proposed revocation of the regulation have been resolved and the Commissioner's conclusions are issued in the Federal Register. The Commissioner's proposal to revoke this regulation is published elsewhere in this issue of the Federal Register (40 FR 26683).

Therefore, pursuant to provisions of the Federal Food, Drug, and Cosmetic Act (secs. 201(s), 409, 701(a), 52 Stat. 1055, 82 Stat. 1784–1788 as amended (21 U.S.C. 321(s), 348, 371(a))) and under authority delegated to the Commissioner (21 CFR 2.120): *It is ordered*, That the effective date of September 23, 1974 for § 121.1261 *Electrolytic diaphragm process for salt*, as published in the Federal Register of September 23, 1974, be stayed until such time as the Commissioner, by further order, revokes such stay.

Dated: June 18, 1975.

Sherwin Gardner,
Deputy Commissioner of Food and Drugs.

[FR Doc.75-16514 Filed 6-24-75;8:45 am]

[FAP5H5048/T2 (FRL-390-7)]

PART 123—TOLERANCES FOR PESTICIDES IN FOOD ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY

Subpart A—Food Additives Permitted in Food for Human Consumption

2, 4-D

The U.S. Department of Interior, Bureau of Reclamation, Washington, DC 20240, has filed a food additive petition (FAP 5H5048) with the Environmental Protection Agency (EPA). This petition proposed that 21 CFR 123.100 be amended to establish a food additive tolerance for residues of the herbicide 2,4-D (2,4-dichlorophenoxyacetic acid) in potable water at 0.1 part per million resulting from application of the dimethylamine salts of 2,4-D and the butoxyethanol ester of 2,4-D to the Fort Cobb Reservoir in central Oklahoma during an experimental program to control Eurasion watermilfoil. This experimental use program is authorized by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

The data submitted in the petition and other relevant material have been evaluated. Residues of the herbicide will result in potable water from aquatic uses as provided for by the experimental use permit issued under FIFRA and therefore a tolerance is being established to coincide with this use and to protect the public health.

Any person who will be adversely affected by this regulation may on or before July 25, 1975, file written objections with the Hearing Clerk, Environmental Protection Agency, 401 M Street, SW, East Tower, Room 1019, Washington DC 20460. Such objections should be submitted in quintuplicate and specify the provisions of the regulation deemed objectionable and the grounds for the objections. If a hearing is requested, the objections must state the issues for the hearing. A hearing will be granted if the objections are supported by grounds legally sufficient to justify the relief sought.

Part 123, Subpart A, is being amended by revising § 123.100 to read as follows.

(Sec. 409(c)(1) & (4) Federal Food, Drug, and Cosmetic Act (21 U.S.C. 348(c)(1) & (4)) transferred to the Administrator EPA in Reorg. Plan No. 3 (35 FR 15623))

Dated: June 20, 1975.

Lowell E. Miller,
Acting Deputy Assistant Administrator for Pesticide Programs.

Section 123.100 is amended by adding the new paragraph "0.1 part per million . . ." after the last paragraph to include a tolerance for 2,4-D in potable water to read as follows.

§ 123.100 2,4-D.

* * * * *

0.1 part per million (negligible residue) in potable water. Such residue may be present therein only as a result of application of the dimethylamine salts of 2,4-D and the butoxyethanol ester of 2,4-D to the Fort Cobb Reservoir in central Oklahoma under an experimental use program which expires June 20, 1976. This program is to be conducted by the Bureau of Reclamation, U.S. Department of Interior. Residues remaining in potable water after June 20, 1976 will not be considered actionable if the pesticide is legally applied during the term and in accordance with provisions of the experimental permit/food additive tolerance.

* * * * *

[FR Doc.75-16580 Filed 6-24-75;8:45 am]

SUBCHAPTER G—COSMETICS

[Docket No. 75N-0005]

PART 701—COSMETIC LABELING

Hypoallergenic Cosmetic Products; Correction

In FR Doc. 75-14734 appearing at page 24442 in the Federal Register of Friday, June 6, 1975: In the center column on page 24451, the second sentence of paragraph (e)(6) is corrected to read "In addition, the most prominent use of the word 'hypoallergenic' or such similar or related term on any principal display panel shall be followed by such phrase."

Dated: June 18, 1975.

Sam D. Fine,
Associate Commissioner for Compliance.

[FR Doc.75-16511 Filed 6-24-75;8:45 am]

CHAPTER II—DRUG ENFORCEMENT ADMINISTRATION, DEPARTMENT OF JUSTICE

PART 1308—SCHEDULES OF CONTROLLED SUBSTANCES

Placement of Chlordiazepoxide in Schedule IV; Reservation of Application of Order to Librax and Menrium

On May 29, 1975, the Administrator of the Drug Enforcement Administration issued a final order amending § 1308.14 of Title 21 of the Code of Federal Regulations (CFR) to include chlordiazepoxide, and five other members of the benzodiazepine class of drugs, in Schedule IV of the Comprehensive Drug Abuse Prevention and Control Act of 1970 (21 U.S.C. 801–966). This notice was published in the Federal Register on June 4, 1975 (40 FR 23998), and provided that Schedule IV controls would apply beginning July 2, 1975.

On May 29, 1975, the Administrator also issued a notice of proposed rulemaking, to amend 21 CFR 1308.32 (Excepted Compounds), by including in that section Librax and Menrium, products which contain chlordiazepoxide in such combinations, quantity, preparation or concentration which the Administrator has found vitiates the potential for abuse of chlordiazepoxide.

This notice was published in the Federal Register on June 5, 1975 (40 FR 24216–17) and provided an opportunity for all interested persons to submit comments, objections and requests for a hearing on the matter no later than July 15, 1975. The notice further provided that if no objections which merit a hearing are received by that date, a final order without a hearing may then be issued.

If a final order is issued without a hearing, it would take effect at least 30 days after its publication in the Federal Register, unless the Acting Administrator finds that conditions of public health or safety necessitate an earlier effective date, pursuant to 21 CFR 1308.48. Therefore, a period of at least six weeks would exist between the date on which Schedule IV controls for chlordiazepoxide take effect, and the effective date of any final order which might be issued listing Librax and Menrium as excepted compounds. This would render Librax and Menrium Schedule IV controlled substances during such period, which would reflect that these products possess the requisite degree of potential for abuse for inclusion in Schedule IV.

Such legal status of these products would be inconsistent with the findings set out in the June 5, 1975 notice that the potential for abuse of chlordiazepoxide is vitiated when in the Librax and Menrium preparations.

Therefore, under the authority vested in the Attorney General by sections 301 and 501(b) of the Comprehensive Drug Abuse Prevention and Control Act of 1970 (21 U.S.C. 821, 871(b)), and delegated to the Administrator of the Drug Enforcement Administration by § 0.100 of Title 28 of the Code of Federal Regulations, and further, having been duly designated as Acting Administrator by Order No. 607-75 of the Attorney General, dated May 30, 1975, in accordance with the authority stated therein, and pursuant to the authority delegated to the Acting Administrator by § 0.132(d) of Title 28 of the Code of Federal Regulations, the Acting Administrator of the Drug Enforcement Administration hereby amends the order, issued by the Administrator of the Drug Enforcement Administration on May 29, 1975, and published in the FEDERAL REGISTER on June 4, 1975, to provide that the application of such order is reserved in the following respects:

1. The requirements of labeling and packaging, inventory, recordkeeping, prescriptions, importation, exportation, and the security requirements of 21 CFR 1301.74(d), which are imposed upon chlordiazepoxide by the order of the Administrator issued May 29, 1975 and published in the FEDERAL REGISTER on June 4, 1975 and which are set out therein, are hereby reserved as to Librax and Menrium pending final disposition of the June 5, 1975 notice proposing that Librax and Menrium be listed as Excepted Compounds, and thus be excepted from the application of sections 305, 307, 308, 309, 1002, 1003 and 1004 of the Act.

(21 U.S.C. 825, 827-9, 952-4, and of 21 CFR 1301.74(d)).

This order amending the order of June 4, 1975 is effective June 25, 1975.

Dated: June 20, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16635 Filed 6-24-75;8:45 am]

Title 25—Indians

CHAPTER I—BUREAU OF INDIAN AFFAIRS, DEPARTMENT OF THE INTERIOR

PART 221—OPERATION AND MAINTENANCE CHARGES

San Carlos Irrigation Project, Arizona

On Page 17029 of the FEDERAL REGISTER of April 16, 1975, there was published a notice of proposal to revise § 221.63 of Title 25, Code of Federal Regulations. Interested persons were given 30 days within which to submit written comments, suggestions or objections with respect to the proposed amendment. No comments, suggestions, nor objections have been received; therefore, pursuant to the authority vested in the Secretary of the Interior for issuance of irrigation operation and maintenance orders fixing per acre assessments against lands included in Indian irrigation projects, delegated to the Commissioner of Indian Affairs by Order No. 2508 (10 BIAM 2.1, section 15a) and redelegated to the Area Directors by 10 BIAM 4.1, the proposed amendment is hereby adopted without change as set forth below.

§ 221.63 Assessment, joint works.

(a) Pursuant to the Act of Congress approved June 7, 1942 (43 Stat. 476), and supplementary acts, the repayment contract of June 8, 1931, as amended, between the United States and the San Carlos Irrigation and Drainage District, and in accordance with applicable provisions of the order of the Secretary of the Interior of June 15, 1938 (§§ 221.69a-221.69m), the cost of the operation and maintenance of the Joint Works of the San Carlos Indian Irrigation Project for the fiscal year 1977 is estimated to be $600,000 and the rate of assessment for the said fiscal year and subsequent fiscal years until further order, is hereby fixed at $6.00 for each acre of land.

JOHN ARTICHOKER, Jr.,
Area Director.

[FR Doc.75-16540 Filed 6-24-75;8:45 am]

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 384-4]

PART 52—APPROVAL AND PROMULGATION OF STATE IMPLEMENTATION PLANS

Pennsylvania: Approval of Compliance Schedules

Section 110 of the Clean Air Act, as amended (42 U.S.C. 1857c-5), and the implementing regulations of 40 CFR Part 51, require each State to submit a plan which provides for the attainment and maintenance of the national ambient air quality standards throughout the State. Each such plan is to contain legally enforceable compliance schedules setting forth the dates by which all stationary and mobile sources, must be in compliance with any applicable requirement of the plan.

On May 31, 1972 (37 FR 10842), pursuant to section 110 of the Clean Air Act and 40 CFR Part 51, the Administrator of the Environmental Protection Agency ("EPA") approved portions of Pennsylvania's State Implementation Plan.

Pursuant to 40 CFR 51.6, the Commonwealth of Pennsylvania has submitted for the Environmental Protection Agency's approval, a revision to the compliance schedule portion of its plan. The approval of this revision was proposed by the Administrator on April 4, 1975 (40 FR 15095). This publication approves this revision.

Revisions previously submitted by the Commonwealth of Pennsylvania have been published in the FEDERAL REGISTER on August 22, 1974 (39 FR 30349), October 10, 1974 (39 FR 36481), and November 27, 1974 (39 FR 41363).

The Administrator has not received public comments concerning the proposed approval of the compliance schedule listed in the April 4, 1975 FEDERAL REGISTER notice. Even though the date by which final compliance is to be achieved has passed since the proposed approval of this schedule, EPA feels that final promulgation is appropriate.

The revision established a date by which the individual air pollution source must attain compliance with an emission limitation specified by the State Implementation Plan. This date is indicated in the table below under the heading "Final compliance date." An evaluation report has been prepared for the listed compliance schedule and is available for public inspection at the Region III Office in Philadelphia, Pennsylvania. The compliance schedule listed here is available for public inspection at the following locations:

Environmental Protection Agency
Region III
Curtis Building
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Bureau of Air Quality and Noise Control
Fulton National Building
208 North Third Street
Harrisburg, Pennsylvania 17120

Freedom of Information Center
Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

The compliance schedule listed below has been adopted by the Pennsylvania Bureau of Air Quality and Noise Control and submitted to the Environmental Protection Agency after notice and public hearing in accordance with the procedural requirements of 40 CFR Part 51. The compliance schedule for the source identified below meets the requirements of 40 CFR 51.15.

This regulation will become effective July 25, 1975.

(42 U.S.C. § 1857c-5).

Dated: June 19, 1975.

JOHN QUARLES,
Acting Administrator.

Part 52 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart NN—Pennsylvania

In § 52.2036(a) the table is amended by adding the following schedules:

§ 52.2036 Compliance schedules.

(a) * * *

Source	Location	State regulation(s) involved	Date of adoption	Effective date	Final compliance date
West Penn Power Co., order No. 73-679-V.	Armstrong County.	123.11, 123.22, 123.41	July 20, 1973	Immediately...	Apr. 30, 1975

[FR Doc.75-16555 Filed 6-24-75;8:45 am]

[FRL 389-4]

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Delegation of Authority to State of Idaho

Pursuant to the delegation of authority for the standards of performance for new stationary sources (NSPS) to the State of Idaho on June 9, 1975, EPA is today amending 40 CFR 60.4, Address, to reflect this delegation. A notice announcing this delegation is published today at 40 FR 26728. The amended § 60.4, which adds the address of the State of Idaho, Department of Health and Welfare to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on June 9, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 111 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-6.)

Dated: June 18, 1975.

ROBERT H. BAUM,
Acting Assistant Administrator for Enforcement.

Part 60 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 60.4 paragraph (b) is amended by revising subparagraph (N) to read as follows:

§ 60.4 Address.

* * * * *

(b) * * *

(A)–(M) * * *

(N) State of Idaho, Department of Health and Welfare, Statehouse, Boise, Idaho, 83701.

* * * * *

[FR Doc.75-16553 Filed 6-24-75;8:45 am]

Title 47—Telecommunication

CHAPTER I—FEDERAL COMMUNICATIONS COMMISSION

[No. 35577]

PART 1—PRACTICE AND PROCEDURE

PART 21—DOMESTIC PUBLIC RADIO SERVICES (OTHER THAN MARITIME MOBILE)

Various Procedural Requirements for the Domestic Public Radio Services and Other Services; Correction

In the Order in the captioned proceeding, released May 29, 1975 (FCC 75-607) published at 40 FR 24005, make the following correction:

Change the third sentence of paragraph (a) of § 21.14 (in the appendix) to read:

* * * Applications in the Domestic Public Land Mobile and Rural Radio Services shall be filed on FCC Form 401, and applications in the Point-to-Point Microwave Radio, Local Television Transmission, and Multipoint Distribution Services on FCC Form 435 (including FCC Form 430 as required). * * *

Released: June 9, 1975.

FEDERAL COMMUNICATIONS COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretary.

[FR Doc.75-16523 Filed 6-24-75;8:45 am]

[Docket Nos. 19880; 35720]

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

PART 89—PUBLIC SAFETY RADIO SERVICES

One-Way Medical Paging; Correction

The Appendix to the Commission's Order FCC 75-484 (40 F.R. 20822) released May 7, 1975, is corrected as follows:

1. In instruction number one, § 2.106 is corrected to read as follows:

§ 2.106 Table of frequency allocations.

* * * * *

U.S. Footnotes

* * * * *

U.S. 216—The frequencies 150.775 and 150.790 MHz and the bands 152–152.0150, 163.2375–163.2625, 460.5125–460.5625, 462.9875–463.1875, 465.5125–465.5625, and 467.9875–468.1875 MHz are authorized for Government/non-Government operations in medical radio communications systems.

* * * * *

Released: June 13, 1975.

FEDERAL COMMUNICATIONS COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretary.

[FR Doc.75-16522 Filed 6-24-75;8:45 am]

[Docket No. 19869]

PART 94—PRIVATE OPERATIONAL-FIXED MICROWAVE SERVICE

Private Operational-Fixed Microwave Radio Service; Correction

Rule changes adopted in the Commission's Report and Order in Docket 19869, FCC 75-469, released May 6, 1974, and published at 40 FR 20917 are corrected as follows:

§ 94.25 [Amended]

1. In § 94.25(g), the third sentence is corrected by inserting the word "ambient" before the words "radio signal level." In paragraph (h), the first sentence is corrected by substituting "cable" for the term "community antenna."

§ 94.31 [Amended]

2. In § 94.31(e), the parenthetical reference "(See § 94.25(d).)" is added at the end of the paragraph.

§ 94.61 [Amended]

3. In § 94.61(b), the table is corrected by adding footnote [16] to the frequency band 13,200 to 13,250 MHz. The footnotes applicable to that band are: [8], [14], and [16]. In addition, footnote [8] is corrected to substitute Part 74 for Part 00 following the words "and with stations in the Instructional Television Fixed Service (ITFS)".

§ 94.65 [Amended]

4. In § 94.65(h), the introductory heading is revised to read "(h) 12,200–12,700 MHz."

§ 94.71 [Amended]

5. In § 94.71(b), footnote [3] is corrected by inserting "MHz" following "8.0" to read: "[3]8.0 MHz on a case-by-case basis."

§ 94.75 [Amended]

6. In § 94.75(b), the first column of the table is corrected by substituting "6,525 to 6,875" for "6,575 to 6,875".

§ 94.161 [Amended]

7. In § 94.161(b), the phrase "conditions in each case, as deemed necessary" is substituted for "conditions in each use and deemed necessary".

Released: June 10, 1975.

FEDERAL COMMUNICATIONS COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretary.

[FR Doc.75-16521 Filed 6-24-75;8:45 am]

Title 50—Wildlife and Fisheries

CHAPTER IV—ANADROMOUS FISHERIES (DEPARTMENT OF THE INTERIOR—DEPARTMENT OF COMMERCE)

PART 401—ANADROMOUS FISHERIES CONSERVATION, DEVELOPMENT AND ENCHANCEMENT

Revision of Regulations

On February 14, 1975 a notice of proposed rulemaking was published in the FEDERAL REGISTER (40 FR 6786) to revise current administrative procedures and to incorporate provisions of recent amendments to the Anadromous Fish Conservation Act (79 Stat. 1125; 16 U.S.C. 757a–757f).

Forty-five days were given within which any person wishing to do so could file written comments, suggestions or objections pertaining to the proposed regulations with the Director, National Marine Fisheries Service or Director, U.S. Fish and Wildlife Service. All comments with respect to the proposed revision were given due consideration.

Twenty-one comments on the published rulemaking were received. Eleven States and one non-Federal entity had no objections to the proposed rulemaking as written. Among the remaining comments received relevant to the proposed regulations, specific references were made to Federal Management Circular 74-7 and to coordination of an application submitted for Federal assistance. After consideration of all relevant material presented by interested persons, the proposed rulemaking is hereby adopted as final regulations, subject to the following changes set forth below:

1. The phrase "and solicited recommendations from" is added to § 401.5 following the word "with" in the third line and the word "or" is changed to "and" in the fourth line, to make the provision comport more closely with the long standing policy of obtaining the views and recommendations of those States and other non-Federal entity(s) that have management authority over a resource, prior to committing Federal funds.

2. The phrase "as set forth in Attachment C of Federal Management Circular 74-7" and the sentence "Record retention for a period longer than 3 years is required if audit findings have not been resolved" have been added in § 401.15. This will provide an applicant with information that is essential to comply with Federal requirements relative to the retention of records and supporting documents.

3. The phrase "as set forth in Attachment O of Federal Management Circular 74-7" is added to § 401.18 following the word "requirement" in the sixth line. This will clearly identify the Federal Circular and Attachment that is the source of relevant Federal laws, regulations, policies, guidelines and requirements.

Accordingly, 50 CFR Part 401 is revised as set forth below.

Effective date. This regulation shall be effective June 25, 1975.

Signed at Washington, D.C. on June 17, 1975.

Lynn A. Greenwalt,
Director,
U.S. Fish and Wildlife Service.

Robert U. Schoning,
Director,
National Marine Fisheries Service.

Sec.
401.1 Administration.
401.2 Definitions.
401.3 Submission of documents.
401.4 Activities prohibited.
401.5 Coordination with States.
401.6 Prosecution of work.
401.7 General information for the Secretary.
401.8 Availability of funds.
401.9 Payments to cooperators.
401.10 Request for payment.
401.11 Property as matching funds.
401.12 Ownership of property.
401.13 Personnel.
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401.15 Record retention.
401.16 Records and reporting.
401.17 Safety and accident prevention.
401.18 Contracts.
401.19 Statements and payrolls.
401.20 Officials not to benefit.
401.21 Patents and inventions.
401.22 Civil rights.

Authority: The provisions of this Part 401 are issued under Anadromous Fish Conservation Act (79 Stat. 1125, as amended, 84 Stat. 214, 88 Stat. 398), 16 U.S.C. 757a-757f.

§ 401.1 Administration.

The Director of the U.S. Fish and Wildlife Service and the Director of the National Marine Fisheries Service shall jointly administer the Anadromous Fish Conservation Act for the Secretaries.

§ 401.2 Definitions.

As used in this part, terms shall have the meanings ascribed in this section.

(a) *Secretary.* The Secretary of Commerce, the Secretary of the Interior, or their authorized representatives.

(b) *Act.* The Anadromous Fish Conservation Act, 16 U.S.C. 757a-757f.

(c) *Eligible states.* Any coastal State of the United States, the State of Vermont, and the States bordering the Great Lakes. The area within the Columbia River basin is excluded.

(d) *State fishery agency.* Any department(s), division(s), commission(s), or official(s) of a State empowered under its laws to regulate a commercial or sport fishery.

(e) *Non-Federal interest.* Any organization, association, institution, business, school, individual, or group of individuals, municipality and others outside the Federal Government, in addition to State fishery agencies, which desire to cooperate within the terms of the Act.

(f) *Cooperator.* One or more States acting jointly or severally or other non-Federal interests, participating in a project agreement or grant-in-aid award with the Secretary.

(g) *Anadromous fish.* Aquatic, gill breathing, vertebrate animals bearing paired fins which migrate to and spawn in fresh water, but which spend part of their life in an oceanic environment; also fish in the Great Lakes that ascend streams to spawn.

(h) *Application for Federal assistance.* A description of work to be accomplished, including objectives and needs, expected results and benefits, approach, cost, location and time required for completion.

(i) *Project agreement.* The formal document executed between the Secretary of the Interior and the Cooperator, committing the Cooperator to the performance of described activities and the Federal Government to participation in the financing of those activities.

(j) *Grant-in-Aid award.* The formal document executed between the Secretary of Commerce and the Cooperator, committing the Cooperator to the performance of described activities and the Federal Government to participation in the financing of those activities.

§ 401.3 Submission of documents.

Applications for Federal assistance and other documents for projects relating generally to recreational fisheries shall be submitted to the concerned Regional Office of the U.S. Fish and Wildlife Service, or for projects relating generally to commercial fisheries of the concerned Regional Office of the National Marine Fisheries Service.

§ 401.4 Activities prohibited.

Law enforcement, public relations, harvesting, marketing and processing activities, construction of fisherman use facilities, and activities concerned with landlocked anadromous fish populations (except fish in the Great Lakes that ascend streams to spawn) may not be financed under the Act.

§ 401.5 Coordination with States.

The Secretary will approve an Application for Federal Assistance only after he has coordinated the application with and solicited recommendations from those State and other non-Federal entities which have management authority over the resource to be affected.

§ 401.6 Prosecution of work.

(a) Project work shall be carried through to a state of completion acceptable to the Secretary with reasonable promptness. Failure to render satisfactory performance reports or failure to complete the project to the satisfaction of the Secretary shall be caused for suspension of Federal assistance for the project until the project provisions are satisfactorily met. Federal assistance may be terminated upon determination by the Secretary that satisfactory progress has not been maintained. The Secretary shall have the right to inspect and review work at any time.

(b) Research and development work shall be continuously coordinated by the Cooperator with studies conducted by others to avoid unnecessary duplication.

(c) All work shall be performed in accordance with applicable local laws, except when in conflict with Federal laws or regulations, in which case Federal laws or regulations shall prevail.

§ 401.7 General information for the Secretary.

Before any Federal funds may be obligated for any project an applicant shall furnish to the Secretary, upon his request, information regarding the laws affecting anadromous fish and the authority of the applicant to participate in the benefits of the Act.

(a) *Document signature.* Individuals authorized to sign project documents under the Commercial Fisheries Research and Development Act of 1964 (78 Stat. 197, as amended), 16 U.S.C. 779-779f, or the Federal Aid in Sport Fish Restoration Act (64 Stat. 430, as amended), 16 U.S.C. 777-777f, may likewise sign project documents contemplated in this Part.

(b) *Program information.* The Secretary may, from time to time, request, and the Cooperators shall furnish, information relating to the administration and maintenance of any project established under the Act.

§ 401.8 Availability of funds.

The period of availability of funds to the States or other non-Federal interests for obligation shall be established by the administering Federal agency.

§ 401.9 Payments to cooperators.

Payments shall be made to Cooperators in accordance with provisions of grant-in-aid awards or project agreements.

§ 401.10 Request for payment.

Request for payment shall be on forms provided by the Secretary, certified as therein prescribed, and submitted to the Regional Director by the Cooperator.

§ 401.11 Property as matching funds.

The non-Federal share of the cost of projects may be in the form of real or personal property. Specific procedures to be used by grantees in placing the value on real or personal property for matching funds are set forth in Attachment F of Federal Management Circular 74-7.

§ 401.12 Ownership of property.

When real property is acquired pursuant to the provisions of the Act, title to such property, or interests therein, shall be vested in the United States, and the conveying instrument shall recite the United States of America as the grantee. However, if the Secretary determines that under the terms of the application for Federal assistance and grant-in-aid award or project agreement, the intent and purpose of the Act may be better served by other ownership of such property, an appropriate transfer may be made. When real or personal property is utilized as matching funds, title to such property shall be in the Cooperator unless otherwise specified in the grant-in-aid award or project agreement.

§ 401.13 Personnel.

The Cooperator shall maintain an adequate and competent force of employees to initiate and carry approved work to satisfactory completion.

§ 401.14 Inspection.

Cooperator supervision of each project shall include adequate and continuous inspection. The project will be subject at all times to Federal inspection.

§ 401.15 Record retention.

All records of accounts and reports with supporting documentation thereto, as set forth in Attachment C of Federal Management Circular 74-7, will be retained by the Cooperator for a period of 3 years after submission of the final expenditure report on the project. Record retention for a period longer than 3 years is required if audit findings have not been resolved.

§ 401.16 Records and reporting.

Performance reports and other reports shall be furnished as requested by the Secretary. Cost records shall be maintained separately for each project. The accounts and records maintained by the Cooperator, together with all supporting documents, shall be open at all times to the inspection of authorized representatives of the United States, and copies thereof shall be furnished when requested.

§ 401.17 Safety and accident prevention.

In the performance of each project, the Cooperator shall comply with all applicable Federal, State, and local laws governing safety, health and sanitation.

§ 401.18 Contracts.

A Cooperator may use its own regulations or guidelines in obtaining services by contract or otherwise, provided that they adhere to applicable Federal laws, regulations, policies, guidelines, and requirements, as set forth in Attachment 0 of Federal Management Circular 74-7. However, the Cooperator is the responsible authority, without recourse to the Federal agency, regarding the settlement of such contractual issues.

§ 401.19 Statements and payrolls.

The regulations of the Secretary of Labor applicable to contractors and subcontractors (29 CFR Part 3), made pursuant to the Copeland "Anti-Kickback" Act (18 U.S.C. 874), as amended, are made a part of the regulations in this part by reference. The Cooperator will comply with the regulations in this part and any amendments or modifications thereof, and the Cooperator's prime contractor will be responsible for the submission of statements required of subcontractors thereunder. The foregoing shall apply except as the Secretary of Labor may specifically provide for reasonable limitation, variations, tolerances, and exemptions.

§ 401.20 Officials not to benefit.

No Member of, or Delegate to, Congress, or resident Commissioner, shall be admitted to any share or any part of any project agreement made under the Act, or to any benefit that may arise therefrom. This provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

§ 401.21 Patents and inventions.

Determination of the patent rights in any inventions or discoveries resulting from work under project agreements entered into pursuant to the Act shall be consistent with the "Government Patent Policy" (President's memorandum for Heads of Executive Departments and Agencies, August 23, 1971, and statement of Government Patent Policy as printed in 36 FR 16889).

§ 401.22 Civil rights.

Each application for Federal assistance, grant-in-aid award, or project agreement shall be supported by a statement of assurances executed by the Cooperator providing that the project will be carried out in accordance with Title VI, Nondiscrimination in Federally Assisted Programs of the Civil Rights Act of 1964 and with the Secretary's regulations promulgated thereunder.

[FR Doc.75-16542 Filed 6-24-75;8:45 am]

Title 10—Energy

CHAPTER I—NUCLEAR REGULATORY COMMISSION

PART 20—STANDARDS FOR PROTECTION AGAINST RADIATION

Storage and Control of Licensed Materials

Section 20.207 of 10 CFR Part 20 requires that licensed materials stored in an unrestricted area be secured against unauthorized removal from the place of storage. The intention of the section is to assure that proper controls are maintained over licensed radioactive materials at all times.

Since the references to "storage" might not clearly convey the intention that constant control be maintained over all licensed radioactive materials in unrestricted areas, § 20.207 is being amended by the addition of clarifying wording to assure unequivocal understanding of the requirement.

Inasmuch as the amendments set forth below are of a minor nature, good cause exists for omitting notice of proposed rule making, and public procedure thereon, as unnecessary, and for making the amendments effective upon publication in the FEDERAL REGISTER.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and sections 552 and 553 of title 5 of the United States Code, the following amendment to Title 10, Chapter I, Code of Federal Regulations, Part 20, is published as a document subject to codification.

Section 20.207 of 10 CFR Part 20 is amended to read as follows:

§ 20.207 Storage and control of licensed materials in unrestricted areas.

(a) Licensed materials stored in an unrestricted area shall be secured from unauthorized removal from the place of storage.

(b) Licensed materials in an unrestricted area and not in storage shall be tended under the constant surveillance and immediate control of the licensee.

Effective date. This amendment becomes effective on June 25, 1975.

(Sec. 161, Pub. L. 83-703, 68 Stat. 948 (42 U.S.C. 2201); Sec. 201, Pub. L. 93-438, 88 Stat. 1242 (42 U.S.C. 5841))

Dated at Bethesda, Md. this 5th day of June, 1975.

For the Nuclear Regulatory Commission.

LEE V. GOSSICK,
Executive Director for Operations.

[FR Doc.75-16549 Filed 6-24-75;8:45 am]

PART 35—HUMAN USES OF BYPRODUCT MATERIAL

Group Licensing for Certain Medical Uses

Notice is hereby given of the amendment of the Nuclear Regulatory Commission's regulation "Human Uses of Byproduct Material," 10 CFR Part 35.

Section 35.100 of 10 CFR Part 35 lists groups of medical uses of radioisotopes that have similar requirements for user training and experience, facilities and equipment, and radiation safety procedures.

The notice of proposed rulemaking that was published in the FEDERAL REGISTER on January 21, 1974 (39 FR 2384) stated that the groups of licensed uses would be amended from time to time to add new radiopharmaceuticals, sources, devices, and uses as they are developed. The use of iodine 125 as seeds for interstitial treatment of cancer has become a well-established clinical procedure and is hereby added to Group VI. An editorial correction is also made in § 35.100(d) (1) to correct the spelling of "hyperthyroidism."

Because these amendments relate solely to procedural matters, the Commission has found that good cause exists for omitting notice of proposed rulemaking, and public procedure thereon, as unnecessary. Since the amendments relieve licensees from restrictions under regulations currently in effect, they may become effective without the customary 30-day notice.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and sections 552 and 553 of Title 5 of the United States Code, the following amendments to Title 10, Chapter I, Code of Federal Regulations, Part 35 are published as a document subject to codification.

1. In § 35.100, paragraph (d) (1) is amended by correcting the word "hyperthyriodism" to read "hyperthyroidism".

2. In § 35.100, Paragraph (f) (7) is amended by changing the period at the end of the paragraph to a semicolon and a new paragraph (f) (8) is added to read as follows:

§ 35.100 Schedule A Groups of medical uses of byproduct material.

* * * * *

(f) *Group VI.* Use of sources and devices containing byproduct material for certain medical uses:

* * * * *

(8) Iodine-125 as seeds for interstitial treatment of cancer.

Effective date. These amendments become effective on June 25, 1975.

(Sec. 161, Pub. L. 83-703, 68 Stat. 948 (42 U.S.C. 2201))

Dated at Bethesda, Md., this 30th day of May, 1975.

For the Nuclear Regulatory Commission.

LEE V. GOSSICK,
Executive Director for Operations.

[FR Doc.75-16457 Filed 6-24-75;8:45 am]

CHAPTER II—FEDERAL ENERGY ADMINISTRATION

PART 205—ADMINISTRATIVE PROCEDURES AND SANCTIONS

Procedures for Notices of Proposed Disallowance and Orders of Disallowance

On June 4, 1975 (40 FR 24541, June 9, 1975) the Federal Energy Administration (FEA) issued proposed regulations for the amendment of procedures concerning notices of proposed disallowance and orders of disallowance under Part 205 (Procedures and Sanctions) of its regulations.

The proposed regulations provide that persons receiving notices of proposed disallowance shall have 10 days to respond before orders of disallowance are issued, and prescribe the method of filing responses and the content of such responses. Notices of proposed disallowance shall automatically ripen into orders of disallowance if no reply is received within the 10-day notice period. Upon review of any reply, FEA will issue a final order of disallowance as appropriate. Orders of disallowance are made appealable.

Four comments were received on the proposed amendments. Several objected to the inclusion of a notice of proposed disallowance and an order of disallowance in the same section as a notice of probable violation and a remedial order. Notices of proposed disallowance and orders of disallowance have been included in this section because they will be handled procedurally within FEA in the same fashion as notices of probable violation and remedial orders. Inclusion of notices of proposed disallowance and orders of disallowance in Subpart O is not meant, however, to imply that actions subject to disallowance have the same substantive character as actions subject to notices of proposed violation and remedial orders. In particular, FEA recognizes that orders of disallowance may issue even though refiners have been acting in good faith. Prices calculated by FEA and used in issuing orders of disallowance are based upon all third-party data available to FEA. Individual refiners, however, do not have access in advance to this data base, and consequently their estimates of arms-length prices may differ somewhat from those derived by FEA.

Several comments were received to the effect that ten days is not a reasonable response period, due to the complexity of the required response. However, § 205.194 (c) of the amended regulation specifically states that the FEA may extend the 10-day period for good cause shown, and it is the intention of the FEA that the complexity of a required response be relevant to such a determination of good cause.

One comment requested that all disallowance notices be published by the FEA, and open to all interested persons for comment. It is the intent of the FEA that upon proper request by a member of the public, disclosure of the Notice of Proposed Disallowance will be released to the public (subject to the statutory exclusions, in particular the exclusion for proprietary information). Such release will be made only after the time designated by the FEA for the filing of written response by the company to which the notice is directed. In addition, all or any portion so designated of any response to the notice by the recipient company will also be released.

Finally, two comments objected that the proposed amendment revises the procedures of § 212.84(e) with respect to remedies. It is not the intent of these amendments to revise § 212.84(e) for the period during which that section is applicable. Further, for disallowances not covered by § 212.84(e), FEA intends to seek rollbacks or actual refunds only to the extent that a refiner has actually recovered such excess costs in his sales.

(Federal Energy Administration Act of 1974, Pub. L. 93-275; E.O. 11790, 39 FR 23185; Emergency Petroleum Allocation Act of 1973, Pub. L. 93-159)

In consideration of the foregoing, Part 205 of Chapter II, Title 10 of the Code of Federal Regulations is hereby amended as set forth below, effective immediately.

Issued in Washington, D.C., June 20, 1975.

ROBERT E. MONTGOMERY, Jr.,
General Counsel.

1. Subpart O of Part 205 is amended in the caption to read as follows:

Subpart O—Notice of Probable Violation, Remedial Order, Notice of Proposed Disallowance, and Order of Disallowance

2. Section 205.190 is amended in paragraph (a) as follows:

§ 205.190 Purpose and scope.

(a) This subpart establishes the procedures for determining the nature and extent of violations of the FEA regulations and the procedures for issuance of a notice of probable violation, a remedial order, a remedial order for immediate compliance, a notice of proposed disallowance, and an order of disallowance, and for the conversion of a notice of proposed disallowance into an order of disallowance pursuant to § 205.194(f).

* * * * *

3. Section 205.194 is revised to read as follows:

§ 205.194 Notice of proposed disallowance and order of disallowance.

(a) The FEA shall begin a proceeding under this section by issuing a notice of proposed disallowance pursuant to provisions of Part 212 of this chapter.

(b) Within 10 days of the serivce of a notice of proposed disallowance, the person upon whom the notice is served may file a reply with the FEA office that issues the notice of proposed disallowance at the address provided in such notice. The FEA may extend the 10-day period for good cause shown.

(c) The reply shall be in writing and signed by the person filing it. The reply shall contain a full and complete statement of all relevant facts pertaining to the act or transaction that is the subject of the notice of proposed disallowance.

(d) The reply shall include a discussion of all relevant authorities, including, but not limited to, FEA rulings, regulations, interpretations, and decisions on appeals and exceptions relied upon to support the particular position taken.

(e) The reply should indicate whether the person requests or intends to request a conference regarding the notice. Any request not made at the time of the reply shall be made as soon thereafter as possible to insure that the conference is held when it will be most beneficial. A request for a conference must conform to the requirements of Subpart M of this part.

(f) If a person has not filed a reply with the FEA within the 10-day period provided, and the FEA has not extended the 10-day period, or if that person has not filed a reply within an allowed extension, that person shall be deemed to have conceded the accuracy of the factual allegations and legal conclusions stated in the notice of proposed disallowance, and the notice of proposed disallowance shall become an order of disallowance.

(g) If the FEA finds, after the 10-day period provided in paragraph (b) of this section or after that period as extended by FEA pursuant to that paragraph, and after consideration of any reply filed, that an order of disallowance is appropriate, it may issue such an order.

(h) If the FEA finds, after the 10-day period provided in paragraph (b) of this section or after that period as extended by FEA pursuant to that paragraph, that for any reason the issuance of an order of disallowance would not be appropriate, or that the amount of the disallowance or the means of affecting the disallowance, as stated in a notice of proposed disallowance, should be modified, it shall issue an order, in writing, to the person to whom the notice of proposed disallowance has been issued indicating that the notice is rescinded or modified and, where appropriate, setting out any modification and the reasons therefor.

(i) A disallowance order issued under this section shall be effective upon issuance, or if a reply is not received within the period allowed in paragraph (b) of this section for such replies, upon termination of that period, and shall remain in effect in accordance with its terms, until stayed, suspended, modified, or rescinded. An order of disallowance shall remain in effect notwithstanding the filing of an application to modify or rescind it under Subpart J of this part.

(j) An order of disallowance may be referred at any time to the Department of Justice for appropriate action in accordance with Subpart P of this part.

4. Section 205.195 is revised to read as follows:

§ 205.195 Remedies.

A remedial order, a remedial order for immediate compliance, or an order of disallowance may require the person to whom it is directed to roll back prices, to refund amounts paid to such person that are in excess of the amount permitted under Part 212 of this chapter, or to take such other action as the FEA determines is necessary to eliminate or to compensate for the effects of a violation or any cost disallowance pursuant to § 212.83 or § 212.84 of this chapter.

5. Section 205.196 is added to read as follows:

§ 205.196 Appeal.

(a) No notice of probable violation or notice of proposed disallowance issued pursuant to this subpart shall be deemed to be an action of which there may be an administrative appeal pursuant to Subpart H of this part.

(b) Any person to whom a remedial order, a remedial order for immediate compliance, or an order of disallowance is issued pursuant to this subpart may file an appeal with the FEA Office of Exceptions and Appeals or with the appropriate Regional Office in accordance with Subpart H of this part. The appeal must be filed within 10 days of service of the order from which the appeal is taken, or within 10 days of the date at which a notice of proposed disallowance has become an order of disallowance pursuant to § 205.194(f).

[FR Doc.75-16579 Filed 6-23-75;8:45 am]

PART 213—OIL IMPORT REGULATIONS

Amendments to Conform Oil Import Regulations to Proclamation No. 4377; Change of Hearing Date

On June 4, 1975, the Federal Energy Administration issued regulations implementing certain provisions of Proclamation No. 4377, amending Proclamation No. 3279, as amended, which establishes the Mandatory Oil Import Program (40 FR 24718, June 10, 1975). The hearing date for these regulations was set for June 26, with a continuation date of June 27 if necessary. The hearing was also to be utilized for presentation of views concerning proposed regulations for implementing certain other provisions of Proclamation No. 4377, which FEA expected to issue shortly after the June 4 regulations. However, because of an unanticipated delay in issuing these proposed regulations, the hearing on both the final regulations and the proposed regulations has been postponed, in order to afford interested persons sufficient time to study the proposed regulations. The new hearing date is July 15, with a continuation date of July 16. The hearing location remains room 2105, 2000 M Street NW., Washington, D.C., and the starting time remains 9:30 a.m., e.d.s.t.

In view of the change in hearing dates, the period provided for request to speak and submission of statements has been extended correspondingly. Requests for an opportunity to make an oral presentation must now be received by July 7, 1975. In this connection, the person making the request shall leave a phone number where he may be contacted through July 11, 1975. Each person selected to be heard will be so notified before July 9, 1975, and must submit 100 copies of his statement to FEA by July 14. In addition, interested persons may submit questions, to be asked of persons making statements at the hearing, through July 11, 1975.

Finally, the comment period has also been extended. Under the revised schedule, all comments received by July 10, 1975, will now be considered.

Issued in Washington, D.C. on June 23, 1975.

ROBERT E. MONTGOMERY, Jr.,
General Counsel.

[FR Doc.75-16719 Filed 6-24-75;9:28 am]

proposed rules

This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rulemaking prior to the adoption of the final rules.

DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service

[7 CFR Part 921]

HANDLING OF FRESH PEACHES GROWN IN DESIGNATED COUNTIES IN WASHINGTON

Proposed Approval of Expenses and Fixing of Rate of Assessment for 1975–76 Fiscal Period

This notice invites written comment relative to the proposed expenses of $9,262 and rate of assessment of $0.80 per ton of peaches to support the activities of the Washington Fresh Peach Marketing Committee for the 1975–76 fiscal period under marketing Order No. 921.

Consideration is being given to the following proposals submitted by the Washington Fresh Peach Marketing Committee, established under the marketing agreement, and Order No. 921 (7 CFR Part 921), regulating the handling of fresh peaches grown in designated counties of Washington, effective under the applicable provisions of the Agricultural Marketing Agreement Act of 1937, as amended (7 U.S.C. 601–674), as the agency to administer the terms and provisions thereof:

§ 921.215 Expenses and rate of assessment.

(a) That expenses that are reasonable and likely to be incurred by the Washington Fresh Peach Marketing Committee, during the period April 1, 1975, through March 31, 1976, will amount $9,262; and

(b) The rate of assessment for such period, payable by each handler in accordance with § 921.41 be fixed at $0.80 per ton of fresh peaches.

Terms used in the marketing agreement and order shall, when used herein, have the same meaning as is given to the respective term in said marketing agreement and order.

All persons who desire to submit written data, views, or arguments in connection with the aforesaid proposals should file the same, in quadruplicate, with the Hearing Clerk, United States Department of Agriculture, Room 112, Administration Building, Washington, D.C. 20250 not later than July 25, 1975. All written submissions made pursuant to this notice will be made available for public inspection at the office of the Hearing Clerk during regular business hours (7 CFR 1.27(b)).

Dated: June 20, 1975.

D. S. KURYLOSKI,
Acting Deputy Director, Fruit and Vegetable Division, Agricultural Marketing Service.

[FR Doc.75-16565 Filed 6-24-75;8:45 am]

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Food and Drug Administration

[21 CFR Part 1]

[Docket No. 75P–0080]

FROZEN DESSERTS AND DAIRY PRODUCTS

Proposed Exemption From Label Requirements

The Commissioner of Food and Drugs has received a petition submitted by the Milk Industry Foundation and the International Association of Ice Cream Manufacturers, Washington, DC, proposing an exemption from the label information placement requirements of 21 CFR 1.8d for frozen desserts and fluid milk products packaged in cylindrical containers with separate lids. The Commissioner proposes certain changes in the content of the petition. The effect of the Commissioner's proposal would be to exempt conditionally the frozen desserts and milk products listed in § 1.1c(a) (6) (i) and (7) (i) from the placement requirements of § 1.8d for the information required by § 1.8a (name an place of business), § 1.10 (ingredient statement), and § 1.17 (nutrition labeling) if these products are packaged in cylindrical containers with separate lids. Comments concerning this proposal may be filed with the Hearing Clerk, Food and Drug Administration, Rm. 4–65, 5600 Fishers Lane, Rockville, MD 20852 on or before August 25, 1975.

The petitioner's requested revision of § 1.8d(d) would add a new subparagraph as follows:

> Fluid milk products and frozen desserts as described in § 1.1c(a) (6) (i) and § 1.1c(a) (7) (i) respectively, and the products made in semblance of the foregoing when packaged in cylindrical containers consisting of a separate lid and body, designed for use by more than one firm, and the package bears nutrition labeling, shall be exempt from the placement requirements of this section, provided that: (i) The lid is designed as a principal display panel and contains the name and address of the manufacturer, packer, or distributor as required by § 1.8a. (ii) The lid is not required to bear nutrition labeling pursuant to § 1.17 or an ingredient statement pursuant to § 1.10 when this information is presented on the body of the container to the right of the principal display panel.

As grounds in support of the proposal, the petition states that most manufacturers print all required label information on the lid of the container. Since the manufacturer's name and address does not appear on the container body, numerous companies are able to use a common container body or sidewall and are able to use the same container body for different products. However, the petition stated that when using nutrition labeling, the lid will not accommodate all required information. Under the requirements of § 1.8d, if any information required by the sections listed in § 1.8d(b), such as nutrition labeling, is printed on the body of the container, then all other information required by the sections listed in § 1.8d(b) must also appear on the same panel. The petition stated that the cost of containers would rise if container bodies were required to be labeled with the name and address of the individual manufacturer, in effect making the container body a custom printed container rather than an open stock container.

The petition also requested that manufacturers be allowed to place the ingredient statement on either the lid or the body of the container since a dairy product may be made using different ingredients and yet retain the same nutrient content. Thus, if allowed to place the ingredient statement on the lid, manufacturers using different recipes would be able to utilize the same body printed with nutrition labeling. The petition concluded that if the requested exemption is not granted, manufacturers would be forced to have container bodies custom printed with the name and address of the manufacturer, and the ingredient statement, whenever nutrition labeling is used. It would then be necessary for manufacturers to pass the resultant increased costs on to the consumer.

The petition is available for inspection in the office of the Hearing Clerk, Food and Drug Administration.

The Commissioner has considered the petition and is in basic agreement with its content. However, he has made certain changes in the petitioner's proposal. The Commissioner's proposal differs from the petition in that reference to products made using fluid milk has been eliminated since the exemption should also apply to dairy products made from other forms of milk. The phrase "designed for use by more than one firm" has also been eliminated. Although the exemption is intended to allow the continued use of open stock containers, it is not necessary to state this fact in a labeling regulation. The Commissioner's proposal, in accordance with the petition, contains the following provisions: (1) That the list of ingredients may appear either on the lid or on the container body; (2) that nutrition labeling is not required to appear on the lid if this information appears on the body; and (3) that the name and address of the responsible firm will not be required to appear on the body of the container if this information appears on the lid.

The Commissioner's proposal also differs from the petition in that the products would be exempted from the placement requirements of § 1.8d only to the extent described in the proposed amendment, rather than being completely exempted from all placement requirements of § 1.8d. For example, the requirement of § 1.8d(d) that information required pursuant to any given section shall all appear on the same panel would remain in effect, except as specifically exempted by this proposal.

As authorized by the Administrative Procedure Act (5 U.S.C. 553(d)(1)), the Commissioner proposes to make the final regulation effective upon publication in the Federal Register, since it would grant an exemption from existing requirements and would not impose additional burdens on anyone.

Therefore, pursuant to provisions of the Federal Food, Drug, and Cosmetic Act (secs. 201, 403, 701(a), 52 Stat. 1040–1042 as amended; 1047–1048 as amended, 1055; 21 U.S.C. 321, 343, 371(a)) and under authority delegated to the Commissioner (21 CFR 2.120), he proposes that § 1.8d be amended by designating the present text as (d)(1) and by adding a new paragraph (d)(2) to read as follows:

§ 1.8d Food labeling; information panel.

* * * * *

(d) * * *

(2) Any of the foods listed in § 1.1c(a)(6)(i) and § 1.1c(a)(7)(i), when packaged in a cylindrical or nearly cylindrical container consisting of a separate lid and body and bearing nutrition labeling pursuant to § 1.17, and the lid is designed as a principal display panel, shall be exempt from the placement requirements of this section in the following respects:

(i) The name and place of business information required by § 1.8a shall not be required on the body of the container if this information appears on the lid in accordance with this section.

(ii) The nutrition information required by § 1.17 shall not be required on the lid if this information appears on the container body in accordance with this section.

(iii) The statement of ingredients required by § 1.10 shall not be required on the lid if this information appears on the container body in accordance with this section. Further, such information is not required on the container body if this information appears on the lid in accordance with this section.

* * * * *

Interested persons may, on or before August 25, 1975, submit to the Hearing Clerk, Food and Drug Administration, Rm. 4–65, 5600 Fishers Lane, Rockville, MD 20852, written comments regarding this proposal. Comments shall be filed in quintuplicate and shall be identified with the Hearing Clerk docket number found in the document heading. Received comments may be seen in the above office during working hours, Monday through Friday.

Dated: June 18, 1975.

Sam D. Fine,
Associate Commissioner for Compliance.

[FR Doc.75–16512 Filed 6-24-75;8:45 am]

[21 CFR Part 121]

[Docket No. 75G–0116]

ELECTROLYTIC DIAPHRAGM PROCESS FOR SALT

Proposed Revocation

The Commissioner of Food and Drugs is proposing to revoke § 121.1261 *Electrolytic diaphragm process for salt* (21 CFR 121.1261). Comments must be submitted by August 25, 1975.

The Commissioner, in the Federal Register of September 23, 1974 (39 FR 34192), issued a food additive regulation for the production of by-product food grade salt (sodium chloride) from the electrolytic diaphragm process (21 CFR 121.1261). In addition to requiring that this salt meet the specifications of the Food Chemicals Codex, 2d Ed. (1972), the regulation required that the salt contain not more than 0.065 percent alkalinity (calculated as sodium hydroxide) and that the electrodes used in the process not produce impurities that are not present in salt produced by other means. The regulation resulted from a petition requesting affirmation of the generally recognized as safe (GRAS) status of the product salt, and was published in the Federal Register of June 12, 1973 (38 FR 15471), on behalf of the petitioner, Bernstein, Alper, Shoene, and Friedman.

Within the 30day objection period provided for in the order, the Salt Institute (hereinafter called the Institute) filed objections to the regulation and requested a hearing based on these objections. Among the objections of the Institute was the allegation that salt produced by this process may be contaminated with asbestos fibers. This allegation was supported with the description of the conventional electrolytic diaphragm process, which employs an asbestos fiber diaphragm supported on the surface of the cathode. This allegation, and the Commissioner's concern about possible asbestos contamination of this salt, was referred to the petitioner.

The petitioner responded to this allegation by assuring the Commissioner that the company it represented was capable of removing any asbestos or other impurity from the product salt. This assurance included a statement from the petitioner that a sample of this refined salt had been subjected to rigorous testing by expert microscopists and had been found to be free of asbestos fibers. Final reassurance of the high purity of this salt was given in a letter of transmittal, which accompanied a "pilot scale" sample of the salt that was requested by the Food and Drug Administration (FDA).

Three independent analyses have demonstrated the presence of unusually high levels of chrysotile asbestos fibers in the salt sample received by the FDA. In the performed analyses, unidentified samples of chemical reagent grade salt, food grade table salt (purchased from a local Washington, DC, supermarket), and the subject salt (the "pilot scale" sample) were analyzed by a single optical microscopic method and two electron microscopic techniques. While one of the electron microscopic techniques and the optical method did not identify asbestos fibers in either the reagent or the food grade salt, the equivalent of 221 chrysotile asbestos fibers (up to 0.8 millimeter long) was found in 25 grams of the subject salt by optical microscopy, and the equivalent of approximately 16 million chrysotile asbestos fibers (averaging 3.7 microns long, 0.06 micron in diameter, and equivalent to 0.44 part per million asbestos by weight) was found per gram of this same salt by electron microscopy. The third analysis, with higher resolution electron microscopy, found chrysotile asbestos fibers in all three samples. These levels were equivalent to 200,000 fibers (1.0 micron average length) per gram of the chemical reagent grade salt, 80,000 fibers (1.0 micron average length) per gram of the food grade table salt, and 84 million fibers (1.7 microns average length) per gram of the subject salt. Details of the results of these analyses are on display in the office of the Hearing Clerk (address noted below).

Based on the information above, the Commissioner is staying the effective date of this regulation and proposing its revocation. An order staying the regulation and ruling on the objections of the Institute is published elsewhere in this issue of the Federal Register (40 FR 26675). The Commissioner further advises consumers that the petitioner advised him that none of this salt has been marketed by the company it represents.

The Commissioner has concluded that revocation of this order is justified. The amount of impurity in the sample of salt produced by the electrolytic diaphragm process is greater by several orders of magnitude than that in the sample of salt produced by conventional means.

The Commissioner therefore concludes that, under the conditions specified in the regulation, the additional data fail to establish that the electrolytic diaphragm process is capable of producing food grade salt that does not contain levels of asbestos impurity greatly in excess of those in conventionally produced salt, and thus that a fair evaluation of such data fails to establish that the electrolytic diaphragm process is safe under the conditions specified in the regulation.

Therefore, pursuant to provisions of the Federal Food, Drug, and Cosmetic Act (secs. 201(s), 409, 701(a), 52 Stat. 1055, 72 Stat. 1784–1788 as amended (21 U.S.C. 321(s), 348, 371(a))) and under authority delegated to him (21 CFR 2.120), the Commissioner proposes that Part 121 be amended in Subpart D—Food Additives Permitted in Food for Human Consumption, by revoking § 121.1261 *Electrolytic diaphragm process for salt.*

Interested persons may, on or before August 25, 1975, file with the Hearing Clerk, Food and Drug Administration, Rm. 4–65, 5600 Fishers Lane, Rockville, MD 20852, written comments (preferably in quintuplicate) regarding this proposal. Received comments may be seen in the above office during working hours, Monday through Friday.

Dated: June 18, 1975.

SHERWIN GARDNER,
Deputy Commissioner of Food and Drugs.

[FR Doc.75-16515 Filed 6-24-75;8:45 am]

Social and Rehabilitation Service

[45 CFR Part 213]

PRE-HEARING DISCOVERY IN HEARINGS TO STATES ON CONFORMITY OF PUBLIC ASSISTANCE PLANS TO FEDERAL REQUIREMENTS

Proposed Rulemaking

Notice is hereby given that the regulations set forth in tentative form below are proposed by the Administrator, Social and Rehabilitation Service, with the approval of the Secretary of Health, Education, and Welfare. The proposed regulations provide for prehearing discovery in formal administrative hearings accorded under 45 CFR Part 213. Under the proposed regulations, the full range of discovery provided in the Federal Rules of Civil Procedure will be available to parties designated in the Notice of Hearing, subject to the power of the Presiding Officer to limit such discovery to prevent undue delays in the conduct of the hearing.

Under current rules States involved in hearings under Part 213 have ample opportunity to apprise themselves of tehe Department's position on the issues in the hearing and to obtain all relevant and unprivileged documents by making a request for documents under the Freedom of Information Act, 5 U.S.C. 552. The Department has no comparable opportunity to conduct discovery against the State on these issues except in those unusual circumstances where the State involved in the hearing might have its freedom of information act and it is as broad as the Federal Act. This disparity in the opportunity of the parties to a Part 213 hearing to acquaint themselves with relevant information possessed by the other party prior to the commencement of the hearing clearly hinders a full development of all the issues at the hearing and does not accord to both equally the opportunity to avoid surprise during the course of the hearing.

The proposed regulations shall be effective upon publication in final form with respect to all hearings commenced pursuant to 45 CFR 213.11 subsequent to such publication, and to all hearings then in progress, upon request of any party, if the Presiding Officer determines that application of this regulation will not delay the expeditious conduct of the hearing or prejudice the rights of any party thereto.

Prior to the adoption of the proposed regulations, consideration will be given to any suggestions, comments or objections thereto which are received in writing by the Administrator, Social and Rehabilitation Service, Department of Health, Education, and Welfare, PO. Box 2372, Washington, D.C., 20013, on or before July 25, 1975. Comments received will be available for public inspection in room 5324 of the Departments offices at 330 C Street, SW., Washington, D.C., on Monday thru Friday of each week from 8:30 a.m. to 5:00 p.m. (area code 202-245-0950).

(Sec. 1102, 49 Stat. 647 (42 U.S.C. 1302))

(Catalog of Federal Domestic Assistance Program Number 13.714, Medical Assistance Program; 13.748, Work Incentive Program-Child Care-Employment Related Support Services; 13.754, Public Assistance-Social Services; 13.-761, Public Assistance-Maintenance Assistance (State Aid))

Dated: June 9, 1975.

JOHN A. SVAHN,
Administrator, Social and Rehabilitation Service.

Approved: June 19, 1975.

CASPAR W. WEINBERGER,
Secretary.

Part 213, Chapter II, Title 45 of the Code of Federal Regulations is amended by revising § 213.22 and adding a new § 213.23a, as set forth below:

§ 213.22 Authority of presiding officer.

(a) The presiding officer shall have the duty to conduct a fair hearing, to avoid delay, maintain order, and make a record of the proceedings. He shall have all powers necessary to accomplish these ends, including, but not limited to, the power to:

(1) Change the date, time, and place of the hearing, upon due notice to the parties. This includes the power to continue the hearing in whole or in part. In hearings pursuant to section 1116(a) (2) of the Social Security Act (see § 201.4 of this chapter), changes of time are subject to the requirements of the statute.

(2) Hold conferences to settle or simplify the issues in a proceeding, or to consider other matters that may aid in the expeditious disposition of the proceeding.

(3) Regulate participation of parties and amici curiae and require parties and amici curiae to state their position with respect to the various issues in the proceeding.

(4) Administer oaths and affirmations.

(5) Rule on motions and other procedural items on matters pending before him including issuance of protective orders or other relief to a party against whom discovery is sought.

(6) Regulate the course of the hearing and conduct of counsel therein.

(7) Examine witnesses.

(8) Receive, rule on, exclude or limit evidence or discovery.

(9) Fix the time for filing motions, petitions, briefs, or other items in matters pending before him.

(10) If the presiding officer is the Administrator, make a final decision.

(11) If the presiding officer is a hearing examiner, certify the entire record including his recommended findings and proposed decision to the Administrator.

(12) Take any action authorized by the rules in this part or in conformance with the provisions of 5 U.S.C. 551-559.

(b) The presiding officer does not have authority to compel by subpena the production of witnesses, papers, or other evidence.

(c) If the presiding officer is a hearing examiner, his authority pertains to the issues of compliance by a State with Federal requirements which are to be considered at the hearing, and does not extend to the question of whether, in case of any noncompliance, Federal payments will not be made in respect to the entire State plan or will be limited to categories under or parts of the State plan affected by such noncompliance.

§ 213.23a Discovery.

The Department and any party named in the Notice issued pursuant to § 213.11 shall have the right to conduct discovery (including depositions) against opposing parties. Rules 26-37 of the Federal Rules of Civil Procedures shall apply to such proceedings; there will be no fixed rule on priority of discovery. Upon written motion, the Presiding Officer shall promptly rule upon any objection to such discovery action initiated pursuant to this section. The Presiding Officer shall also have the power to grant a protective order or relief to any party against whom discovery is sought and to restrict or control discovery so as to prevent undue delay in the conduct of the hearing. Upon the failure of any party to make discovery, the Presiding Officer may, in his discretion, issue any order and impose any sanction (other than contempt orders) authorized by Rule 37 of the Federal Rules of Civil Procedure.

[FR Doc.75-16501 Filed 6-24-75;8:45 am]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[14 CFR Part 71]

[Airspace Docket No. 75-EA-41]

CONTROL ZONE AND TRANSITION AREA

Proposed Alteration

The Federal Aviation Administration is considering amending §§ 71.171 and 71.181 of Part 71 of the Federal Aviation Regulations so as to alter the Quantico, Va., control zone (40 FR 419) and transition area (40 FR 576).

The Quantico, Virginia, Control Zone hours are presently designated as being effective, "from 0700 to 1800 hours, local time, Thursday through Monday; from 0700 to sunset plus 2 hours and 45 minutes, local time, Tuesday and Wednesday."

In order to accommodate increasing operational commitments and to permit more flexible aircraft utilization and scheduling, the U.S. Marine Corps has requested that the control zone designation be amended to provide for minor variations in the times of control zone designation by the issuance of a Notice to Airmen, and to prvoide for revision to the UHF NDB instrument approach procedure for Quantico MCAS (Turner Field), Quantico, Va.

Interested parties may submit such written data or views as they may desire. Communications should be submitted in triplicate to the Director, Eastern Region, Attn: Chief, Air Traffic Division, Department of Transportation, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamaica, New York 11430. All communications received on or before July 25, 1975 will be considered before action is taken on the proposed amendment. No hearing is contemplated at this time, but arrangements may be made for informal conferences with Federal Aviation Administration officials by contacting the Chief, Airspace and Procedures Branch, Eastern Region.

Any data or views presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

The official docket will be available for examination by interested parties at the Office of Regional Counsel, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamacia, New York.

The Federal Aviation Administration, having completed a review of the airspace requirements for the terminal area of Quantico, Virginia, proposes the airspace action hereinafter set forth:

1. Amend § 71.171 of Part 71 of the Federal Aviation Regulations by deleting the description of the Quantico, Va. control zone in its entirety and by substituting the following in lieu thereof:

Within a 5-mile radius of the center, lat. 38°30'15" N., long. 77°18'15" W. of Quantico MCAS (Turner Field) Quantico, Va.; within 2 miles each side of the Brooke, Va. VORTAC 013° radial, extending from the 5-mile radius zone to 1.5 miles north of the VORTAC and within 3 miles each side of the 183° bearing from the Quantico UHF RBN, extending from the 5-mile radius zone to 8.5 miles south of the RBN. This control zone is effective during the specific dates and times established in advance by a Notice to Airmen. The effective date and time will thereafter be continuously published in the Airman's Information Manual.

2. Amend § 71.181 of Part 71 of the Federal Aviation Regulations by deleting the description of the Quantico, Va. transition area in its entirety and by substituting the following in lieu thereof:

That airspace extending upward from 700 feet above the surface within a 9-mile radius of the center, lat. 38°30'15" N., long. 77°18'15" W. of Quantico MCAS (Turner Field) Quantico, Va.; within a 9.5-mile radius of the center of the airport, extending clockwise from a 270° bearing to a 350° bearing from the airport; within 6.5 miles east and 4.5 miles west of the Brooke, Va. VORTAC 013° radial and 193° radial, extending from 5.5 miles south of the VORTAC to 11.5 miles north of the VORTAC.

This amendment is proposed under section 307(a) of the Federal Aviation Act of 1958 (72 Stat. 749; 49 U.S.C. 1348) and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Jamaica, N.Y., on June 13, 1975.

BRIAN J. VINCENT,
Acting Director, Eastern Region.

[FR Doc.75-16447 Filed 6-24-75;8:45 am]

[14 CFR Part 71]

[Airspace Docket No. 75-EA-43]

TRANSITION AREA

Proposed Designation

The Federal Aviation Administration is considering amending § 71.181 of Part 71 of the Federal Aviation Regulations so as to designate a Chase City, Va., transition area.

A new NDB instrument approach procedure is in development for the Chase City Municipal Airport, Chase City, Va. Provision of controlled airspace for IFR arrival and departure aircraft at the Chase City Municipal Airport will require the designation of a 700-foot floor transition area.

Interested parties may submit such written data or views as they may desire. Communications should be submitted in triplicate to the Director, Eastern Region, Attn: Chief, Air Traffic Division, Department of Transportation, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamaica, New York 11430. All communications received on or before July 25, 1975 will be considered before action is taken on the proposed amendment. No hearing is contemplated at this time, but arrangements may be made for informal conferences with Federal Aviation Administration officials by contacting the Chief, Airspace and Procedures Branch, Eastern Region.

Any data or views presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

The official docket will be available for examination by interested parties at the Office of Regional Counsel, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamaica, New York.

The Federal'Aviation Administration, having completed a review of the airspace requirements for the terminal area of Chase City, Virginia proposes the airspace action hereinafter set forth:

1. Amend § 71.181 of Part 71, Federal Aviation Regulations by adding the Chase City, Virginia 700-foot floor transition area as follows:

CHASE CITY, VIRGINIA

That airspace extending upward from 700 feet above the surface within a 5.5 mile radius of the center of Chase City Municipal Airport, Chase City, Va. (lat. 36°47'18" N., long. 78°30'05" W.); and within 3 miles each side of a 179° bearing from the Chase City, Va. radio beacon (lat. 36°47'21" N., long. 78°30'05" W.) extending from the 5.5 mile radius area to 8 miles south of the radio beacon.

This amendment is proposed under section 307(a) of the Federal Aviation Act of 1958 (72 Stat. 749; 49 U.S.C. 1348) and section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Jamaica, N.Y., on June 13, 1975.

BRIAN J. VINCENT,
Acting Director, Eastern Region.

[FR Doc.75-16448 Filed 6-24-75;8:45 am]

[14 CFR Part 71]

[Airspace Docket No. 75-EA-45]

CONTROL ZONE AND TRANSITION AREA

Proposed Alteration

The Federal Aviation Administration is considering amending §§ 71.171 and 71.181 of Part 71 of the Federal Aviation Regulations so as to alter the Hagerstown, Md., control zone (40 FR 387) and Transition Area (40 FR 505).

A new ILS Rwy 27 instrument approach procedure has been developed for Hagerstown Regional Airport, Hagerstown, Md. A review of the controlled airspace requirements indicates that alteration of the Hagerstown, Md., control zone (40 FR 387, 14741) and Hagerstown, Md., transition area (40 FR 505) is required to provide controlled airspace protection for aircraft executing the instrument approach procedure.

Interested parties may submit such written data or views as they may desire. Communications should be submitted in triplicate to the Director, Eastern Region, Attn: Chief, Air Traffic Division, Department of Transportation, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamaica, New York 11430. All communications received on or before July 25, 1975 will be considered before action is taken on the proposed amendment. No hearing is contemplated at this time, but arrangements may be made for informal conferences with Federal Aviation Administration officials by contacting the Chief, Airspace and Procedures Branch, Eastern Region.

Any data or views presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

The official docket will be available for examination by interested parties at the Office of Regional Counsel, Federal Aviation Administration, Federal Building, John F. Kennedy International Airport, Jamaica, New York.

The Federal Aviation Administration, having completed a review of the airspace requirements for the terminal area of Hagerstown, Maryland, proposes the airspace action hereinafter set forth:

1. Amend § 71.171 of Part 71 of the Federal Aviation Regulations by deleting the description of the Hagerstown, Md.

control zone and by substituting the following in lieu thereof:

"Within a 5-mile radius of the center, 39°42'27'' N., 77°43'50'' W., of Hagerstown Regional Airport, Hagerstown, Md.; within 3 miles each side of the Hagerstown, Md. VOR 239° radial and 059° radial, extending from 8.5 miles southwest of the VOR to 2 miles northeast of the VOR; within 3 miles each side of the Hagerstown, Md. VOR 084° radial, extending from the 5-mile radius zone to the VOR; within 3.5 miles each side of the Hagerstown Regional Airport ILS Runway 27 localizer course, extending from the localizer to 13 miles east of the localizer. This control zone is effective from 0600 to 2230 hours, local time, daily."

2. Amend § 71.181 of Part 71 of the Federal Aviation Regulations by deleting the description of the Hagerstown, Md. transition area and by substituting the following in lieu thereof:

"That airsrace extending upward from 700 feet above the surface within an 8-mile radius of the center, 39°42'27'' N., 77°43'50'' W., of Hagerstown Regional Airport, Hagerstown, Md.; within 3.5 miles each side of the Hagerstown, Md., VOR 239° radial and 059° radial, extending from 11 miles southwest of the VOR to 3 miles northeast of the VOR; within 5 miles each side of the Hagerstown, Md. VOR 081° radial, extending from the VOR to 21 miles east of the VOR; within 6.5 miles north and 4.5 miles south of the Hagerstown Regional Airport ILS Runway 27 localizer course, extending from 5.5 miles west to 11.5 miles east of the intersection of the ILS Runway 27 localizer course and the Frederick, Md. VOR 345° radial."

This amendment is proposed under Sec. 307(a) of the Federal Aviation Act of 1958 (72 Stat. 749; 49 U.S.C. 1348); Sec. 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Jamaica, N.Y., on June 13, 1975.

BRIAN J. VINCENT,
Acting Director, Eastern Region.

[FR Doc.75-16446 Filed 6-24-75;8:45 am]

[14 CFR Part 71]

[Airspace Docket No. 75-GL-44]

TRANSITION AREA

Proposed Designation

The Federal Aviation Administration is considering amending Part 71 of the Federal Aviation Regulations so as to designate a transition area at Black River Falls, Wisconsin.

Interested persons may participate in the proposed rule making by submitting such written data, views or arguments as they may desire. Communications should be submitted in triplicate to the Director, Great Lakes Region, Attention: Chief, Air Traffic Division, Federal Aviation Administration, 2300 East Devon, Des Plaines, Illinois 60018. All communications received on or before July 25, 1975 will be considered before action is taken on the proposed amendment. No public hearing is contemplated at this time, but arrangements for informal conferences with Federal Aviation Administration officials may be made by contacting the Regional Air Traffic Division Chief.

Any data, views or arguments presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

A public docket will be available for examination by interested persons in the Office of the Regional Counsel, Federal Aviation Administration, 2300 East Devon, Des Plaines, Illinois 60018.

An instrument approach procedure has been developed for the Black River Falls Airport. Consequently, it is necessary to provide controlled airspace protection for aircraft executing this new approach procedure by designating a transition area at Black River Falls, Wisconsin.

In consideration of the foregoing, the Federal Aviation Administration proposes to amend Part 71 of the Federal Aviation Regulations as hereinafter set forth:

In § 71.181 (40 FR 441), the following transition area is added:

BLACK RIVER FALLS, WISCONSIN

That airspace extending upward from 700 feet above the surface within a 6½-mile radius of the Black River Falls Airport (Latitude 44°15'05'' N., Longitude 90°51'05'' W.); and within 3 miles each side of the 098° bearing from the Black River Falls Airport, extending from the 6½-mile radius area to 8 miles east of the airport.

This amendment is proposed under the authority of section 307(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1348), and of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Des Plaines, Ill., on June 9, 1975.

JOHN M. CYROCKI,
Director, Great Lakes Region.

[FR Doc.75-16450 Filed 6-24-75;8:45 am]

[14 CFR Part 71]

[Airspace Docket No. 75-NE-25]

TRANSITION AREA

Proposed Designation

The Federal Aviation Administration is considering an amendment to Part 71 of the Federal Aviation Regulations that would designate a 700-foot transition area at Wiscasset, Maine.

A non-federal NDB is being installed at the Wiscasset Airport, Wiscasset, Maine. An Instrument Approach Procedure is being developed utilizing this non-directional radio beacon, and it is necessary to establish a transition area to provide controlled airspace protection for aircraft executing this procedure.

Interested persons may submit such written data or views as they may desire. Communications should be submitted in triplicate to the Director, New England Region, Attention: Chief, Air Traffic Division, Department of Transportation, Federal Aviation Administration, 12 New England Executive Park, Burlington, Massachusetts 01803. All communications received on or before July 15, 1975 will be considered before action is taken on the proposed amendment. No hearing is contemplated at this time, but arrangements may be made for informal conferences with Federal Aviation Administration officials by contacting the Chief, Operations, Procedures and Airspace Branch, New England Region.

Any data or views presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

The official docket will be available for examination by interested persons at the Office of the Regional Counsel, Federal Aviation Administration, 12 New England Executive Park, Burlington, Massachusetts.

The Federal Aviation Administration, having completed a review of the airspace requirements for the terminal area of Wiscasset, Maine, proposes the airspace action hereinafter set forth:

1. Amend § 71.181 of Part 71 of the Federal Aviation Regulations so as to add the following transition area:

WISCASSET, MAINE

That airspace extending upward from 700 feet above the surface within a 5-mile radius of the Center, 43°57'40'' N, 69°42'50'' W, of the Wiscasset, Maine, Airport; within 6-miles on the north side and 4-miles on the south side of the 252° and 072° bearings from the Wiscasset, Maine, NDB, 43°58'57'' N, 69°38'27'' W, extending to 5.5 miles southwest, and 11.5 miles northeast of the NDB; excluding that portion which coincides with the Brunswick, Maine, 700-foot transition area.

under section 307(a) of the Federal Aviation Act of 1958 (72 Stat. 749; 49 U.S.C. 1348) and Section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Burlington, Massachusetts, on June 5, 1975.

QUENTIN S. TAYLOR,
Director, New England Region.

[FR Doc.75-16451 Filed 6-24-75;8:45 am]

[14 CFR Part 71]

[Airspace Docket No. 75-RM-22]

TRANSITION AREA

Proposed Alteration

The Federal Aviation Administration is considering an amendment to Part 71 of the Federal Aviation Regulations which would alter the transition area at Jackson, Wyoming.

Interested persons may participate in the proposed rule making by submitting such written data, views, or arguments as they may desire. Communications should be submitted in triplicate to the Chief, Air Traffic Division, Federal Aviation Administration, Park Hill Station P.O. Box 7213, Denver, Colorado 80207.

All communications received on or before July 25, 1975 will be considered before action is taken on the proposed amendment. No public hearing is contemplated at this time, but arrangements for informal conferences with Federal Aviation Administration officials may be made by contacting the Regional Air Traffic Division Chief. Any data, views, or arguments presented during such conferences must also be submitted in writing in accordance with this notice in order to become part of the record for consideration. The proposal contained in this notice may be changed in the light of comments received.

A public docket will be available for examination by interested persons in the office of the Regional Counsel, Federal Aviation Administration, 10455 E. 25th Avenue, Aurora, Colorado 80010.

An instrument landing system (ILS) will be installed to serve Jackson's Hole Airport. Additional controlled airspace is required to accommodate aircraft conducting the instrument approach procedure that will be developed.

In consideration of the foregoing, the FAA proposes the following airspace action:

In Federal Aviation Regulation Part 71, § 71.181 (40 FR 441), the description of the Jackson, Wyoming transition area is amended to read:

That airspace extending upward from 700 feet above the surface within a 5-mile radius circle centered on the Jackson's Hole Airport (latitude 43°36'24" N, longitude 110°44'14" W), within 5.5 miles west and 9.5 miles east of the Jackson VOR 200°44'13" W), within 5.5 miles west and 9.5 miles east of the Jackson VOR 200° radial, extending from the VOR to 24.5 miles south; and within 2.5 miles each side of the Jackson VOR 020° radial extending from the VOR to 12 miles north of the VOR; and that airspace extending upward from 1200 feet above the surface within 6 miles west and 9.5 miles east of the Jackson VOR 020° radial extending from the VOR to 37.5 miles north of the VOR; within 5 miles each side of the Jackson VOR 107° radial extending from the VOR to 15 miles east of the VOR; and within 6 miles north and 9 miles south of the Dunoir, Wyoming VOR 102° and 282° radials extending from 8 miles east to 21 miles west of Dunoir VOR.

This amendment is proposed under authority of section 307(a) of the Federal Aviation Act of 1958, as amended, (49 U.S.C. 1348(a)), of section 6(c) of the Department of Transportation Act (49 U.S.C. 1655(c)).

Issued in Aurora, Colo., June 26, 1975.

M. M. MARTIN,
Director,
Rocky Mountain Region.

[FR Doc.75-16449 Filed 6-24-75;8:45 am]

Hazardous Materials Regulations Board

[49 CFR Part 172]

[Docket No. HM-103; Notice No. 73-10]

HAZARD INFORMATION SYSTEM

Notice of Termination of Proposal

In the January 24, 1974, FEDERAL REGISTER (39 FR 3164) the Hazardous Materials Regulations Board (the Board) published a notice of proposed rule making seeking public comment on, among other things, a system to identify hazards of materials during transportation known popularly as the Hazard Information (HI) System. Within the framework of these proposed regulations, the Board proposed the use of numerical identifiers (hazard information numbers) as the mechanism for conveying the hazards and multiple hazards of different materials.

Hundreds of comments were received by the Board on the proposal and many interested persons attended a public meeting on February 14, 1974, seeking assistance in their efforts to understand fully the proposed HI System. There was also a public hearing held on February 11 and 12, 1975, that, among other things, served as a forum for the receipt of written and oral comments from persons who were proponents of other methods pertaining to the communication of hazards of materials during transportation.

What has become clear to the Board as a result of the oral and written comments is that there is a definite lack of agreement among the carrier and shipper industries affected, emergency response personnel, and the general public as to the merits of the HI System. Disagreement arises with assertions that the system is too complex, its economic burdens are too great, the HI numbers do not adequately communicate hazard information, and that other hazard communication systems need to be evaluated by the Board and made available for public comment.

The assertion of complexity is based on the assumption that any system must be workable from the standpoint of carrier and shipping industry personnel to assure a high degree of correct compliance. A large number of commenters stated that the proposed HI System is not workable for this purpose. With approximately 59 two-digit hazard information numbers to be applied according to specified criteria to the 14 different placards envisioned by the proposal, there has been serious concern expressed whether proper affixment of the correct type and number of placards on a transport vehicle by either shipper or carrier personnel can be achieved without massive education and re-education programs. The concern with complexity is heightened when placarding of mixed loads is considered.

The foreseeable economic burden of the proposed HI System is considered by the Board as too great in light of the division over the merits of the system and is of special concern because of the present economic situation. Again in terms of the economic question, it has been expressed that the international implications of any unilateral U.S. action are enormous. It has been stated that it is economically essential that whatever system we adopt be either adopted by the United Nations or be compatible with the U.N. System (still under development).

Doubts have also been expressed about whether the two-digit Hazard Information Number adequately communicates hazard information. The reliance on Hazard Information Cards in addition to the two-digit number to communicate potential hazard and emergency response action is a major concern. The concern centers around the logistics of supplying all emergency personnel with Hazard Information Manuals (containing hazard information cards or pages) and the assumption that the manual would be available when needed. Some persons believe that the logistics of supply would be next to impossible and that it is inane to assume availability of the manual when needed. It has been asserted that because the first digit of the two-digit HI number indicates only the United Nation's primary hazard and because the second digit does not relate to the first and does not have a constant meaning, the HI number offers no additional information over that provided by nonnumbered labels and placards without the manual.

The rail industry has pointed to the failure of the HI System to give direct warning of the hazard of containment rupture which they consider a greater hazard in rail transportation than toxicity or corrosiveness. They object to the necessity of emergency response personnel having to get close enough to a tank car in order to read the HI number so that they can determine from the manual the potential hazard and the appropriate emergency response.

Several commenters have also cited examples where the information provided in the manual relative to the HI numbers assigned to certain materials gave inaccurate (and potentially dangerous) emergency response information.

The lack of agreement on the merits of the HI System also stems from the fact that several alternate hazard communication systems have come to the attention of the Board since publication of Docket No. HM-103. There has been a call for further Board evaluation of these systems and an opportunity for public review and comment on them.

In consideration of the foregoing, by this notice the Board is terminating its proposals under this docket pertaining to the use of a two digit number to identify the hazards of materials during transportation. In particular, Subpart G and its appendices are deleted from Notice 73-10 and all other references to hazard information numbers contained in that notice are also deleted. All other proposals made under Notice 73-10, including revisions to the placarding requirements, are still under active consideration by the Board.

Even though the Board has taken the action stated herein, it believes there is still sufficient need for the development and implementation of an effective hazard information system. In order to assist it in giving further consideration to the matter, the Board has published at page 26683 of this issue of the FEDERAL REGISTER an advance notice of proposed rule making seeking public comment on several hazard information systems and criteria it believes should be used in evaluating such systems.

Authority: (18 U.S.C. 831-835; Sec. 6, Pub. L. 89-670, 80 Stat. 937 (49 U.S.C. 1655); Title VI and Sec. 902(h) of Pub. L. 85-726 (49 U.S.C. 1421-1431, 1472(h)).

Issued in Washington, D.C. on June 20, 1975.

J. A. FERRARESE,
Alternate Board Member for the Federal Aviation Administration.

ROBERT A. KAYE,
Board Member for the Federal Highway Administration.

ROBERT WRIGHT,
Board Member for the Federal Railroad Administration.

J. V. CAFFERY,
Alternate Board Member for the United States Coast Guard.

[FR Doc.75-16547 Filed 6-24-75;8:45 am]

[49 CFR Parts 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189]

[Docket No. HM-126]

HAZARD INFORMATION SYSTEMS

Request for Comments

The Hazardous Materials Regulations Board (the Board) is soliciting comments concerning the merits of various Hazard Information Systems (HI-Systems). The Board believes there are deficiences in the hazard communication requirements of its regulations and that a HI-System may be necessary to provide for the adequate communication of hazards of materials in transportation. Some of the benefits that could be derived through implementation of a HI-System are:

1. Recognition of multiple hazards of individual materials;
2. Recognition of multiple hazards of mixed ladings; and
3. Provision of sufficient information whereby fire fighting and other emergency response personnel can acquire immediate information to make better informed judgments on how to handle emergency situations.

By publication of a notice in this issue of the FEDERAL REGISTER (40 FR 26687) the Board has announced termination of further consideration of the use of two digit numbers to identify the hazards of materials during transportation under Docket No. HM-103; Notice 73-10. The Board also stated that there is still sufficient need for development and implementation of an effective hazard information system and made reference to the hazard information systems and criteria included in this advance notice for public comment.

The Board believes that in analyzing various HI-systems it is obvious that, even though they are intended to achieve the same end result, i.e., convey emergency response information, they pursue several different routes or philosophies by attempting to provide (1) information concerning the hazards of a material, (2) information concerning the hazards of a material in combination with the degree of risk involved; and (3) information concerning the actions to be taken during an emergency response situation.

The systems discussed in this notice incorporate these basic philosophies to different degrees and for reasons that can be attributed, at least in part, to the economic, social, and/or indusrial structures of a particular nation, and the authority or interest advocating them. The differences in these philosophies are both subtle and obvious, and they lead to analytical difficulties in choosing criteria by which to evaluate the various systems.

The Board believes that the following criteria, though not necessarily inclusive, are factors to be considered in the evaluation of hazard information systems:

1. Capability of the general public to recognize the existence of the immediate dangers presented by a material;
2. Presentation of information in a manner so that the general public will be able to accurately transmit basic information to emergency response personnel;
3. Compatibility, intermodally and internationally;
4. Capability of applicattion to both bulk and non-bulk shipments;
5. Capability of functioning without use of a manual or other subsidiary documents;
6. Capability to meet the needs of emergency response personnel, carriers, shippers, and the general public;
7. Capability of integration with documentation, packaging, and vehicle identification requirements to help insure accuracy;
8. Capability of implementation without undue economic burden on shippers and carriers; and
9. Capability of indicating degree of hazard.

It is the Board's position that any alpha/numeric/symbolic hazard information system adopted in the future be compatibile with and adaptable to the placards it adopts under Docket HM-103.

The following existing or proposed hazard information systems are summarized in this notice:

1. The previously proposed DOT HI System.
2. The NFPA 704M System.
3. The RID/ADR System.
4. The HAZCHEM System.
5. A proposal by Union Carbide Corporation (similar to a proposal submitted by Air Products and Chemicals Corporation).
6. A proposal by the U.S. Coast Guard.
7. The Canadian System (rail).
8. A proposal by the International Air Transport Association.
9. A proposal by Pennwalt Corporation.

THE DOT HAZARD INFORMATION SYSTEM

This system is based on two digit hazard information numbers on shipping papers, package labels and vehicle placards as hazards communicators. A two digit hazard information number would identify the primary and additional (if any) hazards of a material. The first digit of a hazard information number is the United Nations class number for the material and the second digit indicates whether there are significant additional hazards. A zero indicates there are no significant additional hazards.

There are approximately 59 hazard information numbers to identify materials with hazards ranging from a single hazard, such as "Nonflammable Gas" with the HI number 20, to five hazards for a material that is a "Flammable Solid" that is also "Pyrophoric, Poisonous, Water Reactive and Corrosive" which would have the HI number 47.

Defining criteria for each hazard and a specified precedence of hazards for the assignment of hazard information numbers have been developed so a material meeting a specific defining criteria will always be assigned the same hazard information number—in most cases without review by a government agency. A shipping paper containing the shipping name and classification of a hazardous material would also contain its hazard information number. A package label and a vehicle placard would bear the hazard information number in the lower corner.

An important element of the system is an Emergency Response Manual which consists of a card for each hazard information number to identify the expected health, fire and explosion hazards for each material. These cards also contain suggested responses for use by emergency response personnel during the first 10 to 30 minutes of an incident involving hazardous materials in transportation as well as suggested first aid actions.

NFPA 704 SYSTEM

The system identifies the hazards of the material in terms of three principal catagories, namely "health", "flammability", and "reactivity" (instability); and indicates the order of severity numerically by five divisions ranging from "Four (4)", indicating a severe hazard, to "Zero (0)", indicating no special hazard.

The information is presented by a spatial system of diagrams of a diamond shape signal divided into four segments with "health" always being on the left; "flammability" at the top; and "reactivity (instability)" on the right. Color categories for backgrounds are blue for "health" hazard, red for "flammability", and yellow for "reactivity (instability)."

A fourth space in the diagram should be used to indicate unusual reactivity with water, and is indicated by placing the letter "w" with a line through the center (w) in the space. The space may also be used to indicate other additional information such as pressurized vessels, radioactivity, proper fire extinguishing agent, or protective equipment required in case of fire or other emergencies.

The system for ranking degrees of hazard is based on relative rather than absolute values. The system prescribes the number to be used in each category by describing the effects of the material, in order of severity, in each category, i.e., health, flammability, and reactivity.

RID/ADR SYSTEM (EUROPE)

The RID/ADR System applies only to bulk transport by rail and highway in Europe. It requires that in addition to a placard on the format of the U.N. label, tank vehicles and rail cars must display an orange colored plate 30 cm high and

40 cm wide; this plate must have shown on it in black, two numbers, one above the other. The top number may be either two or three digits and may or may not be preceded by the letter "X". This is the Hazard Identification number. The second number is the United Nations Serial Number of the particular commodity.

The first figure of the Hazard Identification number indicates the primary hazard as follows:

2. Compressed Gas.
3. Flammable Liquid.
4. Flammable Solid.
5. Oxidizer Material or Organic Peroxide.
6. Toxic Material.
8. Corrosive Materal.

The second and third digits indicate secondary or tertiary hazards respectively as follows:

0. No Additional Hazard.
1. Explosion Risk.
2. Gas May Be Given Off.
3. Flammability Risk.
5. Oxidizer Risk.
6. Toxic Risk.
8. Corrosive Risk.
9. Risk of Violent Reaction from Spontaneous Decomposition.

When the first and second digits are the same, an intensification of the primary hazard is indicated e.g., 33 indicates a highly flammable liquid, 66 indicates a very dangerous toxic substance, etc. A refrigerated gas is indicated by a hazard identification number of 22. The number 42 would indicate a flammable solid which may give off a gas upon contact with water. The letter "X" preceding a hazard identification number indicates that water should not be applied to the commodity.

The hazard information number is established by the governmental authorities for each material transported in bulk.

HAZCHEM SYSTEM (UNITED KINGDOM)

In an attempt to give to emergency services information which will enable them to act independently of reference books and instructions, the "Hazchem System" was developed. The basic principle of "Hazchem" is that it gives direct information on the action to be taken by firemen and policemen and requires no interpretation of information on hazards. The United Kingdom accepts the system for international highway and railroad traffic.

The specified hazard identification panel is fire resistant and has an orange reflectorized background on which appears two numbers. The top number gives information on the hazards to be expected and the lower number is the United Nations number by means of which the substance can be precisely identified.

The "Hazchem" code gives information under the following headings:

1. Firefighting media.
2. Personal protection.
3. Explosive risk.
4. Spillages.
5. Evacuation.

The "Hazchem" scale gives information on the firefighting media to be used by the use of the numbers 1, 2, 3, or 4, and information on personal protection, explosive risk and spillage action by the letters PRST and WXYZ. Where the policeman or fireman should consider the possibility of initiating the evacuation of an area the letter E is added. Each fireman and policeman would carry a durable card showing the "Hazchem" scale enabling him to translate letters on a transport vehicle into direct action, simple first aid measures appear on the reverse side of the card.

UNION CARBIDE PROPOSAL

This proposal involves placarding, labeling and documentation to convey hazard information. The placard would be rectangular in shape and would be in two levels. The upper level would display the word "DANGEROUS" in 4-inch high letters. The lower level would consist of 6-inch squares, each bearing a hazard symbol within a diamond, accompanied by appropriate language associated with the hazard symbol. The system contemplates the addition or removal of symbol squares, either by the use of sliding rail holders or self-adhesive squares, as commodities are placed in or removed from the placard vehicles. For empty unpurged vehicles, the "DANGEROUS" placard would be left visible, with the word "EMPTY" displayed on the lower level.

Another proposed placard is diamond shaped similar to the placards presently used by rail carriers. This placard is proposed for both rail and highway and consists of the word "DANGER" displayed diagonally across the placard. The hazard symbols would be attached to the placard as proposed for the rectangular placard. The reverse side of the placard would bear the words "DANGER-EMPTY", for use on empty unpurged rail cars or motor vehicles.

The labeling system proposed by Union Carbide would make use of the present DOT labels used singly for commodities with a single hazard only, and multiple labels for dual or triple hazard materials. As an alternative, single labels with imprinted multiple symbols for dual hazard and triple hazard materials could be utilized.

For shipping paper identification, Union Carbide proposes that for each hazardous material entry, some distinctive letters, such as "HAZ", "DOT", or "HM" be shown preceding the description. In addition, all of the hazard classifications applicable to each material would be shown.

An emergency response manual is suggested by Union Carbide as a means of furnishing supplemental information to emergency personnel. The manual would be alphabetically indexed and cross referenced to all hazards and combinations thereof. The manual would be keyed to the language obtained from the shipping documents, placards or labels.

PROPOSAL BY THE U.S. COAST GUARD

The United States Coast Guard proposed a Hazard Information System as an alternative to the HI System proposed in HM-103. In this approach, the UN label or a placard incorporating the basic design of the UN label is used to identify the primary hazard. A two digit number is applied to the lower quadrant of the label or placard.

The first digit, a number from 1 to 5, indicates the relative degree of the primary hazard (i.e., the hazard identified by the label or placard). The first digit of the hazard information number relates to the primary hazard as follows:

1. Low degree of hazard such as: Combustible liquids with flashpoint over 141°F; solid Class B poison, poisonous by ingestion only; corrosive solid, corrosive to metals only.

2. Intermediate degree of hazard such as: Combustible or flammable liquid with flashpoint between 73–141°F; liquid Class B poison, poisonous by ingestion only; corrosive liquid, corrosive to metals only.

3. High degree of hazard such as: Flammable liquid with flashpoint between —18°F and 73°F; Class B poisons, poisonous by inhalation or skin absorption; corrosive materials, corrosive to skin.

4. Extremely high degree of hazard such as: Flammable liquids with flashpoints below —18°F or Reid vapor pressure above 27 PSIA with flashpoint below 73°F; Class A poisons; pyroforic material.

5. Evacuate area, do not attempt to control fire or spill.

The second digit would indicate the secondary hazard of the commodity based on the U.N. Class Number as follows:

2d digit:	*Meaning*
0	No secondary hazard.
1	Thermal instability hazard.
2	Hazard resulting from gas evolution.
3	Flammable.
4	Flammable solid—dangerous when wet.
5	Oxidizer.
6	Poison.
7	Radioactive.
8	Corrosive.

When no hazard information number has been published for a particular commodity the shipper could determine a hazard information number based on the above criteria. Prior to the initial shipment of the commodity, the shipper would submit the number assigned plus supporting data to the Department of Transportation for approval and subsequent publication in the FEDERAL REGISTER. The shipper could ship the commodity under the hazard number he has determined until such time as the final determination of the number is published by the Department.

Placards on vehicles containing mixed lading bearing different hazard information numbers would bear the hazard information number derived as follows:

1. The first digit would be the highest first digit of all the hazard information numbers on the commodities within the vehicle.

2. The second digit would be one of the second digits of all the hazard informa-

tion numbers on commodities within the vehicle based on the following precedence of severity of secondary hazard: 1, 6, 3, 5, 8, 4, 2, 7.

This system could be summarized on the reverse side of the required shipping documents.

Canadian System

HAZARD INFORMATION—EMERGENCY RESPONSE FORM, CARLOADS

Carload, trailerload, and containerload shipments of dangerous commodities, as defined in regulations, originating in Canada would be accompanied by a Hazard Information—Emergency Response Form which would be furnished by the shipper to the carrier and which would accompany the car, trailer, or container from the shipper's siding to the consignee's siding.

When multi-unit shipments of a single dangerous commodity are made from one shipper at point of origin to one consignee at one destination, one only Hazard Information—Emergency Response Form would accompany each such shipment, and a list of the car numbers would be shown thereon.

In the case of compartmentized tank cars loaded with more than one regulated commodity, a separate response form would be required for each commodity and its location in the car indicated in the appropriate block provided on the form.

The Emergency Response Form would include information on the potential hazards of the commodity under the headings:

Fire
Explosion
Health

Immediate Action Information would be included under the headings:

General
Fire
Spill or Leak
First Aid

The shipper modifies the potential hazard and immediate action information sections where necessary by adding or deleting instructions applicable to the particular commodity being shipped.

In addition, the response form provides the following information:

1. Placard endorsement.
2. Car initials and number.
3. Consignee.
4. Destination.
5. Routing.
6. Proper shipping name.
7. Classification.
8. Placard notation.
9. Date shipped.
10. Shipper.
11. Shipping point.
12. Weight or volume.
13. Shipper's certificate.
14. Emergency telephone number.

IATA System

The system identifies the hazards of the material by a two digit number, with the first digit, which corresponds to the United Nations Class number identifies the main danger; the second digit, which is an arbitrary figure, indicates subsidiary risks. The second digit would be zero (0) if there were no subsidiary risk.

The system uses letters for the second digit in lieu of numbers to indicate tertiary hazards.

The information is presented in a spatial system of diagrams on a rectangular shaped placard divided into three segments, with the primary hazard number always on the bottom left, the secondary hazard number or numeral always on the bottom right. The system provides for a barred "W" in the top portion to indicate reactivity with water. Background colors indicate the following: Orange for first group of each class, white for the second group, and green for the third group, with blue provided for the barred "W".

The system suggests placing the appropriate danger labels next to the placard to make the system more explicit.

The system calls for a "simple rigid card" to be carried by emergency response personnel concerning actions which should be taken from the hazard communication.

Proposal by the Pennwalt Corporation

The system involves labeling, placarding, and documentation as a means of hazard communicators, and is predicated upon the establishment of an "Order of Importance" listing of hazard classifications in which one classification precedes in degree of severity, those which follow it. The assignments are as follows:

1. Explosive materials.
2. Compressed gases.
3. Flammable liquids, combustible liquids, flammable gases.
4. Flammable solids.
5. Oxidizing agents.
6. Poisonous materials.
7. Radioactive materials.
8. Corrosive materials.
9. Miscellaneous materials not covered by any other classification but of sufficiently dangerous character that some means of warning should be displayed.

The corresponding primary hazard number would be printed in the space provided on labels of design similar to the DOT HI System. If the product presents multiple hazards, numbers corresponding to each of the additional hazards would also be printed, with the primary hazards, in the space provided.

Placards are of the general size and shape of present placards required for the various modes of transportation by DOT regulations, with the appropriate label for the material, the shipping name of the material, the corresponding hazard number(s), and the primary classification.

Documentation contains a column, of contrasting background, whose use is restricted solely to entry of the hazard number(s) for each product listed, with the shipping name and classification.

In order to assist interested persons in their efforts to understand the various hazard information systems mentioned in this Notice, copies of all material available to the Board concerning specific systems will be made available for review or will be furnished to persons requesting such additional information. Requests should be addressed to: Chief, Regulations Division, Office of Hazardous Materials, Department of Transportation, Washington, D.C. 20590.

Interested persons are invited to give their views on these hazard information systems or other hazard information systems not discussed in this Notice. In addition, comments are invited relative to the evaluation criteria contained herein or any other criteria that should be considered. Communications should identify the docket number and be submitted in duplicate to the Secretary, Hazardous Materials Regulations Board, Department of Transportation, Washington, D.C. 20590. Communications received on or before November 5, 1975 will be considered before further action is taken. All comments received will be available for examination by interested persons at the Office of the Secretary, Hazardous Materials Regulations Board, Room 6215 Trans Point Building, Second and V Streets, SW., Washington, D.C., both before and after the closing date for comments.

(18 U.S.C. 831–835; Sec. 6, Pub. L. 89–670, 80 Stat. 937 (49 U.S.C. 1655); Title VI and Sec. 902(h) of Pub. L. 85–726 (49 U.S.C. 1421–1431, 1472(h)).)

Issued in Washington, D.C. on June 20, 1975.

J. A. Ferrarese,
Alternate Board Member for the Federal Aviation Administration.

Robert A. Kaye,
Board Member for the Federal Highway Administration.

Robert Wright,
Board Member for the Federal Railroad Administration.

J. V. Caffery,
Alternate Board Member for the United States Coast Guard.

[FR Doc.75–16548 Filed 6–24–75;8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 171]

[FRL 388–7: OPP–42002]

STATE OF GEORGIA

Submission of State Plan for Certification of Pesticide Applicators

In accordance with the provisions of section 4(a)(2) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended (86 Stat. 973; 7 U.S.C. 136) and 40 CFR Part 171 (39 FR 36446 (October 9, 1974) and 40 FR 11698 (March 12, 1975)), the Honorable George Busbee, Governor of the State of Georgia, has submitted a State Plan for Certification of Commercial and Private Applicators of Restricted Use Pesticides to the Environmental Protection Agency (EPA) for approval on a contingency basis. Contingency approval is being requested pending enactment of legislation which has been proposed, and promulgation of regulations implementing this new legislation. Copies of the proposed legislation are attached to the plan.

Notice is hereby given of the intention of the Regional Administrator, EPA Region IV, to approve this plan on a contingency basis.

A summary of this plan follows: The entire plan, together with all attached appendices (except for sample examinations), may be examined during normal business hours at the following locations:

Room 601, 19 Hunter Street, SW., Atlanta, GA 30334 (Pesticides Division, Georgia Department of Agriculture, (404) 656-4958).

Room 110, 1421 Peachtree Street, NE., Atlanta GA 30309 (Pesticides Branch, Air & Hazardous Materials Control Division, EPA Region IV, (404) 526-3222).

Room 401, East Tower, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460 (Federal Register Section, Technical Services Division (WH-569), Office of Pesticide Programs, EPA, (202) 755-4854).

SUMMARY OF GEORGIA STATE PLAN

The Georgia Department of Agriculture has been designated as the State lead agency for the administration of the pesticide applicator certification program, with the Pesticides Division responsible for the program's implementation and coordination, including enforcement activities, except that the Entomology Division will handle enforcement activities for applicators in the structural, household and fumigation subcategories. The Georgia Pesticides Advisory Board advises and will continue to advise the Commissioner of Agriculture in all matters relating to pesticides, their use and application.

Cooperating agencies include the State Cooperative Extension Service, Georgia Department of Natural Resources, and Georgia Structural Pest Control Commission. The Extension Service will be responsible for the applicator certification training courses, preparation of examination questions for commercial applicators, and distribution of applicator core training manuals. The Georgia Department of Natural Resources will develop regulations relating to storage and disposal of pesticides and pesticide containers. The Georgia Structural Pest Control Commission is responsible for the regulations for certification of industrial, institutional, structural, and health related pest control applicators.

Legal authority for the program is contained in the Structural Pest Control Act (1955 Georgia Laws, p. 564; 1967 G.L., p. 299; 1960 G.L., Act No. 612; and 1961 G.L., p. 460), proposed amendments thereto, and the Rules of Structural Pest Control Commission (Chapters 620-1 through 9); Georgia Pesticide Control Act of 1976 (proposed legislation), and Georgia Pesticide Use and Application Act of 1976 (proposed legislation).

The plan indicates that the State lead agency and cooperating agencies have or will have sufficient qualified personnel and funds necessary to carry out the proposed programs. The funding in support of this program for the fiscal year 1976 is $574,903.

The State estimates that 3,080 commerical applicators and 40,000 private applicators will need to be certified. Wallet size identification certificates containing all necessary information will be furnished all applicators, to present to the dealer at the time of restricted use pesticide purchase.

The State lead agency will submit an annual report to EPA on March 1 of each year and special reports as required.

The commercial applicator categories proposed are those which are listed in 40 CFR 171.3. No new categories are proposed. New subcategories proposed are as follows:

(7) Industrial, Institutional, and Structural Pest Control.

(a) Wood Destroying Organisms.

(b) Household Pest Control.

(c) Fumigation.

As applicable, Aerial Application will be listed as a subcategory under the major categories.

The State of Georgia plans to certify commercial applicators by means of two written examinations, one covering the general or "core" material, and the other, the specific requirements of the category or subcategory. Aerial applicators will be required to take an additional examination on aerial application. Training sessions for commercial applicators covering the Federal standards (40 CFR 171.4 and 171.6) will be conducted by the Extension Service. These standards are set forth in detail in the EPA core manual for commercial applicators and the specific category manuals prepared by the State Cooperative Extension Service and Georgia Department of Agriculture. Information about the courses and examination may be obtained from the County Extension Agent (State Cooperative Extension Service) or the Pesticides Field Agent (Georgia Department of Agriculture).

Training for pest control operators (category 7) will cover only the general standards, since the current requirements (since 1955) for competency already exceed those for the Industrial, Institutional, and Structural Pest Control category, and cover part of the general standards. The State has requested that the current certification program of the Structural Pest Control Commission be accepted by EPA for the specific Category 7 standards without any additional demonstration of competency except for written examinations on the general standards which were not covered under the current program. Those commercial applicators who were "grandfathered" in 1955 into the State's program on the basis of experience and training will be required to take written examinations on both the general and specific category standards as required by 40 CFR 171.4(a). The examination schedule is listed in the plan along with experience and educational requirements for applicators.

Private applicators (agricultural commodity producers) will be certified by satisfactorily completing a training course (which will include study questions designed to reinforce the learning process) conducted by County Extension Agents. The training will be based on EPA private applicator standards (40 CFR 171.5 and 171.6) with the EPA private applicator manual being used. If sufficient funds are available, an autotutorial system (strip film or slides, together with a tape and study questions based on the EPA manual) will be provided in the County Extension Agent's office. For those who desire to be certified by a written or oral examination rather than attend a training course, the Department of Agriculture agents will provide the EPA core manual as study material, and subsequently offer the tests.

Private applicators with poor reading comprehension or who cannot read may have someone else read the EPA manual to them, and then take an oral test administered by the Department of Agriculture. Alternatively, they may be tutored by the County Extension Agent or Pesticide Field Agent, with subsequent discussion of review questions. Certification for nonreaders will be limited to the pesticide products for which the private applicator has demonstrated competency. In the future, as needed, the County Extension Agent or the Pesticide Field Agent will make personal contact with the nonreader applicator to inform him of additional information on a pesticide.

Sample examinations and review questions are attached to the plan, as provided for by 40 CFR 171.7(e)(1) (i)(D) and (ii)(C). However, in view of the need to preserve the confidentiality of the examination format, the State of Georgia has requested that the examinations not be made available for public inspection. The Agency agrees with this position, and has removed the sample examinations from the public inspection copies of the plan.

The Georgia State plan also indicates that within 60 days of the final approval of the Government Agency Plan (GAP) by EPA, a statement concerning acceptance of GAP qualified Federal employees will be forwarded for inclusion in the State plan.

State plans for States adjoining Georgia are not sufficiently developed to properly address the issue of reciprocity; when such are considered, any reciprocal agreements will be submitted as amendments to Georgia's State plan.

Other regulatory activities listed in the State plan which will supplement the Georgia certification program are State registration, inspection, and sampling of pesticide products. Under the proposed legislation, all dealers handling restricted use pesticides will be licensed and records will be subject to inspection by the Department of Agriculture.

Duration of certification for both commercial and private applicators will be five years. Commercial applicators will, however, be required to renew their licenses (as opposed to their certification) on an annual basis. The Pesticides Advisory Board will evaluate changing technology annually and updated information will be mailed to all applicators, with personal contact made as needed for nonreaders. Specific recertification requirements will be imposed which must be satisfied before the end of the fifth year from certification. The requirements contemplated by the State include six hours of approved formal training or reexamination.

Enforcement of the Georgia certification program will be carried out by inspectors who will spot check commercial and private applicators to insure that they comply with State and Federal laws and regulations. They will perform regular inspections and follow up reports of suspected violations. An increase of five additional positions to supplement the certification effort has been requested for the fiscal year 1976.

PUBLIC COMMENTS

Interested persons are invited to submit written comments on the proposed State plan for the State of Georgia to the Chief, Pesticides Branch, Region IV, Environmental Protection Agency, Room 110, 1421 Peachtree Street, NE, Atlanta, Georgia 30309. The comments must be received on or before July 25, 1975, and should bear the identifying notation [OPP-42002]. All written comments filed pursuant to this notice will be available for public inspection at the above mentioned locations from 8:30 a.m. to 3:30 p.m. Monday through Friday.

Dated: June 16, 1975.

JACK E. RAVAN,
*Regional Administrator.
Region 4.*

[FR Doc.75-16444 Filed 6-24-75;8:45 am]

FEDERAL COMMUNICATIONS COMMISSION

[47 CFR Part 73]

[Docket No. 20500; FCC 75-642]

LICENSEE-CONDUCTED CONTESTS

Proposed Rulemaking

In the matter of amendment of Part 73 of the Commission's rules relating to licensee-conducted contests, Docket No. 20500.

1. The Commission has recently reviewed its policies as to the conduct of contests by broadcast licensees. It is the purpose of this notice of proposed rulemaking to gather additional information on our policies in this area, and to consider codifying those policies or parts of them.

2. A recurring problem in recent years has been the failure of some licensees to assure that their contests are conducted with due regard for the public interest. As a result, a number of abuses have been brought to the Commission's attention. On two occasions we issued Public Notices dealing with the conduct of broadcast contests.[1] In three instances we terminated the operating authority of stations that engaged in improper contest practices.[2] In numerous other cases we took less drastic action, issuing short-term license renewals or admonishing licensees against such practices.

3. All these sanctions were imposed because we found that the particular practices involved were contrary to the public interest. We believe such practices deceive audiences and are unfair to competitors. However, because many of these unfair practices are not specifically prohibited by the Communications Act of 1934, as amended,[3] nor by our Rules, our enforcement range has been limited to extremes: revocation, denial of renewal, short-term renewal, or admonition. We lack the forfeiture sanction, which has proved to be an effective enforcement tool in other areas, and which we believe would give us desirable flexibility in this area. We therefore propose to adopt a rule (see Appendix A below) proscribing unfair and deceptive contest practices, so we can use the forfeiture sanction when it appears appropriate. We also propose to issue a Public Notice (see Appendix B below) illustrating types of practices that would violate the proposed rule.

4. The proposed rule would require licensees who conduct broadcast contests to take certain steps to assure that they are promoted and conducted properly; the accompanying Public Notice would set out in question and answer form the standards we expect of licensees in presenting such programming. The standards are high, for while contests are particularly susceptible to abuse, abuses can be prevented by diligent licensee attention to the planning and conduct of contests. We therefore expect to hold licensees responsible for their mistakes and those of their employees, except in cases of extraordinary mitigating circumstances.

5. So that we can have the widest possible range of viewpoints before us when we further consider this matter, we solicit the submission of comments on the rule itself and the Public Notice.

6. Authority for institution of this proceeding, and adoption of rules concerning the matters involved, is found in sections 4(i) and 303(f) and (r) of the Communications Act of 1934, as amended.

7. Pursuant to the applicable procedures set out in § 1.415 of the Commission's rules, interested persons may file comments on or before August 29, 1975, and reply comments on or before September 29, 1975. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this notice.

8. In accordance with the provisions of § 1.419 of the rules, an original and 14 copies of all comments, replies, pleadings, briefs, and other documents shall be furnished the Commission. Responses will be available for public inspection during regular business hours in the Commission's Broadcast and Docket Reference Room at its Headquarters in Washington, D.C.

Adopted: May 29, 1975.

Released: June 25, 1975.

FEDERAL COMMUNICATIONS
COMMISSION,[4]
[SEAL] VINCENT J. MULLINS,
Secretary.

§ 73.12 Licensee-conducted contests.

A licensee that broadcasts information about a contest it conducts shall fully and accurately disclose to its audience the material terms of the contest, and shall conduct the contest substantially as announced.

NOTE: Commission interpretations in connection with this rule may be found in the attached Public Notice entitled "Applicability of Licensee-Conducted Contests Rule."

APPENDIX B

APPLICABILITY OF LICENSEE-CONDUCTED CONTESTS RULE

The presentation of false or misleading program material violates a licensee's basic duty to deal honestly with its audience, and is contrary to the public interest. In our 1960 Report and Statement of Policy regarding broadcast programming,[1] we said:

> Broadcasting licensees must assume responsibility for all material which is broadcast through their facilities. This includes all programs and advertising material which they present to the public. With respect to advertising material the licensee has the additional responsibility to take all reasonable measures to eliminate any false, misleading, or deceptive matter . . . . This duty is personal to the licensee and may not be delegated. He is obligated to bring his positive responsibility affirmatively to bear upon all who have a hand in providing broadcast matter for transmission through his facilities so as to assure the discharge of his duty to provide acceptable program schedule consonant with operating in the public interest in his community.

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[1] Our most recent Public Notice on the conduct of broadcast contests, issued March 15, 1974, dealt principally with contests that are not fairly conducted or are falsely or misleadingly advertised. 45 FCC 2d 1056, 29 RR 2d 1125. An earlier Public Notice expressed our concern about contests that adversely affect the public interest by resulting in damage to public and private property, creating disorder, and diverting police from other duties. 2 FCC 2d 464, 6 RR 2d 671 (1966). While the matters dealt with in the 1966 Public Notice are not included in the scope of this proposed rule, we continue to be concerned about the abuses described in that Notice, and shall continue to enforce the policies summarized in it.

[2] Eleven Ten Broadcasting Corp., 32 FCC 706, 22 RR 699 (1962); reconsideration denied, 33 FCC 92, 22 RR 702N (1962). KWK Radio, Inc., 34 FCC 1039, 25 RR 577 (1963); reconsideration denied, 35 FCC 561, 1 RR 2d 457 (1963); affirmed, 337 F. 2d 540, 2 RR 2d 2071 (1964); cert. denied, 380 US 910 (1965). Santa Rosa Broadcasting Co., Inc., 9 FCC 2d 644, 10 RR 2d 970 (1967).

[3] Some contest practices fall within the prohibitions of Section 509 of the Communications Act, and in such cases we have imposed forfeitures. See Eastern Broadcasting Corp., 8 FCC 2d 611, 10 RR 2d 393 (1967); Kern County Broadcasting Co., 14 FCC 2d 292, 13 RR 2d 1191 (1968); and Bremen Radio Company, 38 FCC 2d 992, 26 RR 2d 574 (1973).

[4] Commissioners Hooks and Washburn absent.

[1] FCC 60-970, 25 FR 7291, 20 RR 1901.

In a 1966 letter to WCHS-AM-TV Corp., 4 FCC 2d 376, 7 RR 2d 730, we reminded licensees "* * * of their duty to protect the public from false, misleading or deceptive advertising, whether such advertising is sponsored by other parties or is broadcast by the licensee in promoting its own station." Since then we have consistently held that false, misleading, or deceptive information about contests and similar promotional programming is contrary to the public interest.

In our March 1974 Public Notice about contests, we said that "* * * a licensee's contests should be conducted fairly and substantially as represented to the public, and that a failure to do so falls short of the degree of responsibility expected of licensees." The Notice listed a number of practices that raise serious questions of licensee responsibility, including:

(a) Disseminating false or misleading information regarding the amount or nature of prizes;

(b) Failing to control the contest to assure a fair opportunity for contestants to win the announced prize;

(c) Urging participation in a contest, or urging persons to stay tuned to the station in order to win, at times when it is not possible to win prizes;

(d) Failing to award prizes, or failing to award them within a reasonable time;

(e) Failing to set forth fully and accurately the rules and conditions for contests;

(f) Changing the rules or conditions of a contest without advising the public or doing so promptly;

(g) Using arbitrary or inconsistently applied standards in judging entries.

Other objectionable practices we have noted include:

(h) Secret assistance to contestants or predetermination of winners;

(i) The apparent determination of winners solely by chance, when in fact chance played little or no part;

(j) The broadcast of false clues in connection with a contest;

(k) Inadequate supervision of the conduct of contests.

Drawing now on several years' experience in dealing with contest practices we believe to be improper, we have adopted a rule prescribing certain steps licensees should take to assure that contests they present are conducted fairly. The questions and answers that follow show the application of this rule to common types of contest situations—the examples should be considered illustrative rather than exhaustive.

Questions and Answers

SCOPE OF RULE

1. What types of contests come within the scope of the rule?

For the purpose of § 73.12—, a contest includes any arrangement in which a prize is offered for award to the public. A prize can be anything of value: cash, negotiable instruments, securities, merchandise, services, tickets, trips, recording contracts, personal appearances, and so on. The means of selecting a winner is not significant for the purpose of defining a contest, but typically involves ability, skill, knowledge, chance, or similar factor or combination of factors. The rule applies to all contests (a) conducted by the licensee and (b) broadcast to the public. The rule does not apply to licensee-conducted contests not advertised to the public. For example, we consider sales contests among station employees a private matter between the licensee and its employees, and exclude such contests from the scope of this rule. It is recognized that broadcast stations often advertise contests for businesses, non-profit groups, or others, with no licensee involvement in the actual conduct of the contests. will be understood—and not misconstrued—by the station's audience.

Where a licensee's only connection with a contest is to advertise it for another, its responsibility is the same as for commercial announcements in general: The licensee should "* * * take all reasonable measures to eliminate any false, misleading or deceptive matter * * *"[2] Where a licensee is co-promoter of a contest, the higher standards of § 73.12— apply.

MATERIAL CONTEST TERMS

2. What are the material terms of a contest?

The material terms of a contest are those factors which are significant in defining the operation of the contest. From the potential contestant's viewpoint they are the factors which affect his or her decision whether or not to participate in the contest, and which tell how to participate and win. While the material terms of a contest will of course depend on the nature of the contest, in general they will include information about prizes, eligibility restrictions, how to participate, how winners are selected, and other similar information. For example, Station XXXX conducts a contest in which a $100 cash prize is to awarded. Anyone is eligible to enter as often as he or she wishes, and may do so by mailing a post card to the station. The winner will be selected by random drawing of the cards received. In this simple contest the material terms are the prize, the method of entering the contest, eligibility restrictions, and the method of selecting the winner. The licensee should specify that the prize is $100 cash, that the contest is entered by mailing post cards to the station, and that the winner will be selected by a drawing of the cards. The cut-off date for accepting entries (the only eligibility restriction in this contest) should be announced well before the deadline date (see question 21). In more complex contests, special or unusual rules applying to the contest should be made clear.

DISCLOSURE OF MATERIAL CONTEST TERMS

3. How should the material terms of a contest be disclosed:

The material terms should be disclosed by announcements broadcast on the station conducting the contest. They should be stated whenever the station purports to set out the conditions or terms of the contest (whether on the air or in other media), but need not be given in full with brief promotional announcements that do not purport to set out the conditions or terms of the contest.[3] However, no contest description should be false, misleading, or deceptive with respect to any material term. The information given should be clear and understandable. Video announcements should be in letters of sufficient size to be readily legible to an average viewer, should be shown against a background which does not reduce their legibility, and should remain on the screen long enough to be read in full by an average viewer. Similarly, audio announcements should be understandable to an average listener. The nature of the station's audience should be taken into account; for example, if the audience includes children too young to read, video announcements would not be adequate. Licensees should therefore carefully review promotional material before its use to assure themselves that the material

4. When should the material terms of a contest be disclosed?

The obligation to disclose the material terms of a contest arises when the station's audience (a) is asked to participate in the contest and (b) has enough information about the contest to make participation possible. Participation in this sense includes any act done to further one's opportunity to win a prize, such as:

(a) Submitting an entry (post card, telephone call, or other).

(b) Undertaking contest-related activities in anticipation of submitting an entry (collecting signatures or proofs-of-purchases, for example).

(c) Listening to a radio station for specific contest information (contest clues, cues to call a special contest telephone number, and so on).

An invitation to participate may be explicit ("Send your guess today!") or implicit ("Collect the greatest number of orange widgets and win!"). The latter is an invitation to participate since it effectively invites the audience to undertake contest-related activities (collecting orange widgets) in anticipation of submitting an entry.

5. On May 15 station XXXX begins promoting an upcoming contest with announcements such as, "The Spring Sweepstakes Contest is coming soon to XXXX!" On May 20 it adds announcements such as, "Enter the XXXX Spring Sweepstakes!" On May 25 announcements such as, "Win $500 in the XXXX Spring Sweepstakes Contest!" are broadcast. On May 30 the audience is told how to enter the contest. When does the obligation arise to disclose the material terms of the Spring Sweepstakes Contest?

The obligation to disclose the material terms of the contest arises when potential contestants (a) are asked to participate in the contest and (b) have enough information about the contest to make participation possible. The May 15 announcements neither invite participation nor tell how to participate, so disclosure is not required May 15. The May 20 announcements invite participation, but do not tell how to participate; if information about how to participate has not been disseminated, disclosure is not required May 20. Similarly, the May 25 announcements do not tell how to participate, so disclosure is not required. Disclosure is finally required on May 30, for then the audience has both been asked to participate and been told how to participate.

ELIGIBILITY RESTRICTIONS

6. Station XXXX conducts a call-in contest, each time asking for a contestant from a specified telephone exchange. Once, the announcer intends to ask for a caller from the 632 exchange, but forgets to name the exchange. The first caller is from the 456 exchange. Should he or she be permitted to participate in the contest?

Yes. Any eligibility restriction is a material contest term, and should be disclosed fully and accurately. If a restriction is not reasonably disclosed, that restriction must be presumed by the audience not to apply; and a licensee that applies a restriction not reasonably disclosed will not have conducted the contest substantially as announced.

7. Can any eligibility restriction be applied?

Generally, yes. The rule does not prohibit the use of any eligibility restriction reasonably disclosed. However, some restrictions (for example, race or sex) might be contrary to the public interest. Common eligibility restrictions include time deadlines, residence, and a number of entries per person.

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[2] Report and Statement of Policy re: Commission En Banc Programming Inquiry, FCC 60-970, 25 FR 7291, 20 RR 1901 (1960). Even this standard may be high; see, for example, Public Notice re: Applicability of Lottery Statute to Certain Contests and Merchandise Sales Promotions, 18 FCC 2d 52, 16 RR 2d 1559 (1969).

[3] Examples of such promotional announcements are: "Win up to $1,000 on XXXX!" "Play High-Low with XXXX! You may win!" "XXXX, your $100 Cash Words station!"

CONTEST PRIZES

8. Station XXXX promotes a contest as offering "vacations" at a distant resort. In fact the prizes consist of only hotel accommodations: Winners must provide their own transportation, meals, and expense money. Are the announcements misleading?

Yes. Since the term "vacation" popularly connotes more than just lodging, it should not be used where the prize is so limited. Prize descriptions should clearly indicate the nature and value of the prizes offered, and should not mislead, whether by misstatement, exaggeration, implication, or omission of material facts. The ultimate test of descriptions of material terms—including prize descriptions—is how they are likely to be perceived by the station's audience.

9. Station XXXX conducts a contest in which an entrant wins by correctly guessing the prize offered. What information should be disclosed about the prize?

In such a contest a licensee may disclose as much or as little information about the prize as it chooses. Disclosure of the prize is not required in contests where non-disclosure is an essential element in the operation of the contest. However, any information published must be accurate and not misleading. Thus, it would not be an accurate description for a station to advertise a secret-prize contest as offering cash prizes of $1 to $10,000 if the maximum prize to be offered is only $2,000, even though $2,000 does lie between $1 and $10,000.[4] Reasonable rounding-off is of course not misleading.

10. Station XXXX conducts a contest offering an item of merchandise as grand prize. The item regularly sells for $250 in the station's area, but was bought for $300 worth of advertising time. As consolation prizes, the station made a wholesale purchase of 1,000 T-shirts for $1.25 each, though the equivalent T-shirt sells for $2.00 at retail. For advertising purposes, how should XXXX value the prizes?

Prizes should be promoted at their normal retail value, the retail price a member of the station's audience could expect to pay for the identical prize or its equivalent. In the example given, XXXX should advertise the grand prize as worth $250, and the consolation prizes as worth $2.

11. Station XXXX promotes a contest by saying the winner will receive the keys to an automobile. In fact the winner receives just that: The keys, but no car. Is such advertising misleading? Probably. The advertising may imply that not only will the keys be awarded, but that an automobile will be part of the prize. If so, and if an automobile is not part of the prize, the station has not fully and accurately disclosed a material term of the contest, and its failure to award the car would constitute a failure to conduct the contest substantially as announced.

12. Station XXXX conducts a contest offering dozens of prize packages collectively worth hundreds of thousands of dollars, but each worth about $5,000. The contest will have two winners, each of whom may choose one of the prize packages. How should the prizes be advertised?

Since only about $10,000 in prizes will be awarded, the licensee should avoid giving the misleading impression that it may award hundreds of thousands of dollars worth of prizes. The truth is, the contest offers only two winners a single prize package each. Announcements indicating that $10,000 in prizes will be offered or given away would be acceptable, as would announcements that each winner will receive $5,000 in prizes. Announcements indicating that, "You can win $10,000 in prizes," would be unacceptable, since the odds that a single person would win both prizes are practically nonexistent.

13. Station XXXX conducts a "Treasure Chest" contest, offering 25 different prizes, each worth about $40. There will be a single winner, who may win 1, 5, 10, or all 25 of the prizes. Would it be acceptable to advertise the contest as a $1,000 Treasure Chest?

Yes. This differs from the contest in the previous example in that all $1,000 in prizes can be won. As long as all the prizes in the chest can be won (in other words, as long as they are all offered), the sum of their individual values can be publicized without deceptively overstating the prize values. (But see questions 14 and 24.)

14. Station XXXX conducts a contest offering $1,000 to any listener who can present a dollar bill matching a serial number read over the air. During the course of the contest, 1,000 serial numbers are to be broadcast. Would it be acceptable to advertise the contest as offering $1,000,000 in prize money?

No. The licensee should not "offer" more in prizes than it can reasonably expect to award. Because the odds that a listener might have the dollar bill whose serial number is announced are so small, it is likely there will be but a few winners. The odds that there will be 1,000 winners (or any number even approaching that many) are practically nonexistent.

DETERMINING WINNERS

15. Station XXXX conducts a contest in which the winner is to be selected by a random drawing of entries. Before the drawing, though, a winner is selected by some other means, and the drawing is a sham. Has the contest been conducted substantially as announced?

No. A contest is not conducted substantially as announced if the means of determining the winner is not the same as announced to the public.[5] It is a serious deception when legitimate entrants have no chance to win, as when:

(a) A nonexistent winner is announced to avoid awarding the prize.

(b) The prizes are awarded to predetermined winners.

16. Station XXXX conducts a "Turkey Shoot" contest. Once an hour a contestant who calls the station is permitted to guess how many shots will be required to hit the turkey: One, two, three, or four. Following the guess, a tape recording of shots is played. If the number of shots matches the contestant's guess, the contestant wins a turkey. If not, no prize or a small consolation prize is won. What problems can contests of this type present?

The most common problem is that the winner-determining process may not operate the way it appears to. In the example given, contest procedures imply that whether a particular contestant wins depends entirely on the chance coincidence of his or her guess and the number of shots on the tape. If for any reason chance is not the sole factor determining winners in such a contest, the contest will not have been conducted substantially as announced. Thus, a contest would be conducted improperly if a station employee selects a tape that is known to match or not to match the contestant's guess, or if the number of winners is controlled by some means other than chance.

17. Station XXXX conducts a contest in which the winner will be the first entrant to identify a secret celebrity; XXXX broadcasts daily clues as to the identity of the celebrity. A listener, confused by a clue, calls the station requesting a clarification. What should XXXX do?

Fair conduct of a contest requires that each entrant have a fair opportunity to win. If special information or assistance that could affect the outcome of a contest is given some entrants without being made available to all, the contest will not have been conducted substantially as announced. Thus, no contestant or group of contestants should be given special information or assistance that is not available to the station's entire audience. An additional factor is present in the case described: Since time of entry partly determines the winner, XXXX should not give any information to the caller that it has not already made available to its audience.

18. What disclosure should be made about tie-breaking procedures?

Where it could reasonably be anticipated that there might be more than one winner for a particular prize, the means of breaking the tie is a material contest term which should be disclosed. For example, a contest with a single $10,000 cash prize ends with 100 eligible "winners." Will the station award each of the 100 $10,000? Will it divide the $10,000 equally among the 100? Will it conduct a random drawing to select a single winner? If the tie could reasonably have been anticipated, a tie-breaking procedure should have been adopted and disclosed.

CHANGES IN MATERIAL CONTEST TERMS

19. Can changes be made in contests after they begin?

Changes in material contest terms—including the addition and deletion of terms—may constitute failure to conduct the contest substantially as announced. For the Commission's purposes, a licensee's liability under the rule will be determined by the circumstances of the change; and if the licensee's actions are reasonable, no sanction will be imposed. Factors considered include:

(a) The extent and significance of the change.

(b) Whether the change unfairly disadvantages some contestants.

(c) Whether the change is necessitated by circumstances beyond the licensee's control.

(d) Whether the circumstances requiring the change could have been anticipated.

When it is determined that a material contest term must or should be changed after it has been announced, fair conduct of the contest requires that:

(a) Impact of the change be minimized to reduce the possibility of unfairly disadvantaging some contestants.

(b) The change be announced promptly and conspicuously.

20. Station XXXX begins an hourly call-in contest without mentioning any eligibility restrictions, but decides to limit each contestant to a single call after noticing that a

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[4] High-Low contests present a unique problem, and somewhat greater flexibility in announcing the prize range would be reasonable. However, a serious question of prize overstatement would be raised if several successive secret prizes were offered, all worth substantially less than the maximum announced.

[5] This and some of the following examples may also involve violations of section 509 of the Communications Act of 1934, as amended.

small group of them are making most of the calls. Is this proper?

Yes. Like all other changes in material contest terms, changes in eligibility restrictions will be considered in light of such factors as those mentioned in question 19. Since this change is made to make the contest fair to a greater number of potential contestants and does not unfairly disadvantage any, it is a proper change. However, adequate notice of it should be given, and it should not be applied retroactively.

21. Station XXXX begins a contest in which the winner will be selected by drawing a post card entry, but does not state a deadline date for accepting entries. Has it improperly failed to disclose a material contest term?

No. However, the deadline date should be announced far enough in advance for a person who wishes to enter the contest to do so. The amount of time required would vary from a few seconds (for telephone entries) to a few days (for simple mail entries) to even longer (for entries requiring special effort). In the case of mail entries, it should be specified whether the deadline date is the date of postmark or the date of receipt.

22. Station XXXX conducts a contest with an announced prize of a vacation trip to Buenos Aires. After the contest begins, though, arrangements for the trip fall through, and XXXX substitutes a different prize. Has the licensee improperly failed to conduct the contest substantially as announced?

The answer depends on the circumstances of the change, as mentioned in question 19. In this case the licensee should:

(a) Take reasonable steps from the beginning to assure itself that the prizes offered will be available when the contest is concluded.

(b) Attempt to secure an equivalent prize if the original becomes unavailable.

(c) Substitute a prize of roughly comparable value if an equivalent prize cannot be secured.

(d) Announce the change to its audience as soon as possible.

The Commission will find the change improper if, for example:

(a) The licensee fails to take reasonable steps from the beginning to assure the availability of prizes.

(b) The licensee did not intend to award the originally offered prize.

(c) The licensee fails to make a good-faith effort to secure an equivalent or comparably valued prize.

(d) The change is not promptly and conspicuously announced to the station's audience.

23. Station XXXX conducts a contest offering a year's car washes as the prize. Two weeks after the contest begins, a set of tires is added to the prize. Two weeks later a car is added. Is there anything improper about these prize changes?

No. Since no contestant is unfairly disadvantaged by the increases in prize value, these changes are not improper. However, reductions in prize value are suspect, raising the question whether there was a reasonable chance the larger prizes could be won.

MISREPRESENTATIONS

24. Station XXXX conducts an hourly Turkey Shoot contest, but once a day adds a bonus $100 if the contestant wins a turkey. On a particular day the bonus-prize hour occurs in the early morning; but the station's announcers continue to tell contestants later in the day that they may win $100. Has the contest been conducted improperly?

Yes. When a station states or implies that a prize can be won when in fact it cannot, a material contest term (whether the prize can be won) has not been fully and accurately disclosed, and the contest has not been conducted substantially as announced. Similar misrepresentations occur when:

(a) A station urges its audience to look for a hidden prize before it is hidden.

(b) A station urges submission of entries that it knows no longer have a chance to win (for example, after receipt of a correct entry in a contest where the earliest correct entry is the winner).

(c) A station announces a $1,000 Treasure Chest contest (see question 13), but there is no way all $1,000 in prizes can be won.

25. Station XXXX conducts a contest offering $5,000 in merchandise prizes to a single winner. The winner will be the first person to call a designated telephone number once the station announces that calls will be accepted. The station urges its audience to stay tuned for an imminent announcement that calls will be accepted ("* * * maybe in five minutes, maybe in five hours, maybe in five days * * *"), though the announcement will not be made for two weeks. Are the promotional announcement improper?

Yes. Representations that it is possible to win the contest in the immediate future are false if it will not be possible to win for a substantially longer time. Such announcements do not accurately disclose a material contest term (when the prize can be won), and are therefore improper.

OTHER PROBLEMS

26. Station XXXX conducts a contest in which, to win, a person must listen for his or her name to be announced on the air, then call a special telephone number within five minutes. The telephone line is used for other station business, though, and is sometimes busy when contestants call the station. What should the station do?

The station should take special care to see that the telephone line is free when names are broadcast. If attempts to keep the line open do not succeed, the station should change the operation of the contest to assure that contestants have a reasonable chance to win. Failure to take such action may constitute failure to conduct the contest substantially as announced.

27. Station XXXX conducts a contest offering an automobile, and announces a winner. However, the winner does not receive the prize until more than a year after the contest ends. Is the delayed award of the prize improper?

Yes. The prompt award of prizes at the conclusion of a contest is an implied material term of every contest unless there is an announcement to the contrary. Unreasonable delay in awarding prizes, therefore, is a failure to conduct the contest substantially as announced.

28. Station XXXX conducted a Scavenger Hunt contest, publishing a list of items to be collected. As the contest progressed, it became apparent that the list was ambiguous, and XXXX modified the requirements slightly. At the end of the contest there was no clear winner, though two contestants claimed to have met all the requirements. How should the stations have avoided these problems?

Contest rules and procedures should have been carefully reviewed in advance to assure that all likely problems had been anticipated and avoided. In this case scavenger-list decriptions should have been thoroughly analyzed to eliminate ambiguities, and special attention should have been given to the procedure for determining the winner. Any clarifications required during the course of the contest should have been announced to the station's audience so no contestant would have an unfair advantage. Where such precautions are not taken, the contest may not be conducted substantially as announced.

29. Station XXXX plans a contest and sets out rules for its operation. Once the contest begins, however, station employees disregard the rules, and the contest is not conducted substantially as announced. Is the licensee responsible?

Yes. Since contests by their very nature carry great potential for abuse because of the prizes associated with them, the Commission expects licensees to exercise special care in supervising and controlling them to assure that they are conducted fairly and substantially as represented to the public. If due to inadequate licensee supervision, station employees do not conduct a contest properly, the licensee will be held accountable.

[FR Doc.75-16315 Filed 6-24-75;8:45 am]

[47 CFR Part 73]

[Docket No. 20499; FCC 75-641]

BROADCAST LICENSEES

Prohibition of Certain Fraudulent Billing Practices

In the matter of Amendment of § 73.1205 of the Commission's rules in order to prohibit certain fraudulent billing practices, Docket No. 20499.

1. Notice of proposed rulemaking is hereby given in the above-entitled matter.

2. On October 20, 1965, the Commission amended Part 73 of its rules and regulations to prohibit fraudulent billings practices by broadcast licensees. 1 FCC 2d 1068. At the same time it adopted a Public Notice on Applicability of the Fraudulent Billing Rule, which provided illustrations of certain such practices with which the Commission had become familiar. 1 FCC 2d 1075. On May 13, 1970, the Commission amended the rule to provide clarifying language regarding its scope, and added to the previous Public Notice on the applicability of the rule, two more examples relevant to the amendment adopted on that date. At the same time, the Commission combined in one subpart, § 73.1205, the previous three sections dealing with the AM, FM and TV services. 23 FCC 2d 70. The present text of § 73.1205 is as follows:

Section 73.1205 Fraudulent billing practices. No licensee of a standard, FM, or television broadcast station shall knowingly issue to any local, regional or national advertiser, advertising agency, station representative, manufacturer, distributor, jobber, or any other party, any bill, invoice, affidavit or other document which contains false information concerning the amount actually charged by the licensee for the broadcast advertising for which such bill, invoice, affidavit or other documents is issued, or which misrepresents the nature or content of such advertising or which misrepresents the quantity of advertising actually broadcast (number or length of advertising messages) or the time of day or date at which it was broadcast. Licensees shall exercise reasonable diligence to see that their agents and employees do not issue any documents which would violate this section if issued by the licensee.

NOTE: Commission interpretations in connection with the rule may be found in a separate Public Notice issued May 18, 1970, entitled "Applicability of Fraudulent Billing Rule" (FCC 70-513, 35 FR 7906).

3. Since adoption of the rule, the Commission has imposed many forfeitures on licensees for violation thereof and has designated for renewal or revocation hearing, a number of cases based in whole or in part on issues involving fradulent billing. However, the Commission stated in a Public Notice dated December 7, 1972, 38 FCC 2d 1051, that it continued to receive fraudulent billing complaints, frequently confirmed by staff investigation, thus indicating that past sanctions had "by no means accomplished their purpose of causing all licensees to discontinue this practice." The notice stated further:

> The Commission considers violation of the fradulent billing rule to be a particularly serious one because it involves participation by the licensee in a fraud, and thus raises serious questions as to his qualifications to remain a licensee. Therefore, it intends to examine each case more closely in light of the questions raised as to the licensee's qualifications.

Since that date the Commission has instituted revocation proceedings or designated hearings on renewal applications in a number of additional fraudulent billing cases, and it intends to pursue this course whenever it appears to be warranted by the facts. *

4. In recent years a number of instances have come to the attention of the Commission wherein licensees falsely certified to networks with which they were affiliated that they had broadcast certain network programs in their entirety, whereas in fact the licensees had deleted portions of the network programs or had not carried the programs at all. The Commission made it clear that it considered such false certifications to constitute fraudulent billing within the meaning of § 73.1205, and imposed sanctions in a number of instances. See, for example, "Radiozark Broadcasting of Louisiana, Inc.", 32 FCC 2d 603 (1971) and "Channel 13 of Las Vegas, Inc.", 37 FCC 2d 518 (1972). In order to clarify its policies regarding "network clipping," the Commission on March 2, 1973 issued a Public Notice entitled "'Clipping' of Radio and Television Network Programs." 40 FCC 2d 136. The first two paragraphs of that Public Notice are particularly pertinent to our present proposal to amend the fraudulent billing rule:

> Affiliation contracts between broadcast stations and networks typically provide that the station will be compensated for carrying specific network programs, commercials, and other material, including, but not limited to, network identifications, credit announcements or promotional material. In order to collect payment, the station periodically submits a statement to the network certifying that the specified network material has been broadcast. A certification form usually has space to indicate deletions or cancellations of network material. If deletions or cancellations are indicated by the station, the amount of payment received from the network may be reduced. "Network clipping" means that the licensee has not fulfilled its contractual obligation to the network, by certifying that specified network material was broadcast in full when there were, in fact, cancellations or deletions. Because of the number of complaints that have been filed with the Commission on network clipping, often confirmed upon investigation, this public notice is being issued to clarify further the Commission policy in this area, as well as pertinent rules and Commission cases dealing with network clipping.
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> Licensees are cautioned that as a general proposition the Commission considers falsely certifying that network material has been carried to be a use of a licensed facility for fraudulent purposes, which raises serious questions as to a licensee's qualifications to hold a broadcast authorization. The Commission's concern exists regardless of whether the clipped material consists of advertising, program content, or other material provided by the network, and regardless of whether network clipping exists because of the licensee's knowing participation, its indifference, or its failure to adequately supervise or control its employees or agents.

5. As stated in the Public Notice as quoted above, we believe that falsely certifying that network material has been carried, whether the material consists of advertising, program content, or other material provided by the network, is use of a licensed facility for fraudulent purposes, raising serious questions as to a licensee's qualifications to hold a broadcast authorization. We believe that similar questions are raised when a licensee furnishes false information regarding the broadcast of program matter supplied by any other party with which the licensee has entered into a contract or other agreement obligating the licensee to provide specified information concerning the broadcast of the program or program matter supplied by such party. We have in mind, inter alia, program syndicators which furnish consideration to licensees to carry their programs as supplied to the licensees, including in many cases commercial announcements sold by the syndicator or program packager, which the licensee has agreed to broadcast as consideration for receiving the right to broadcast the program. Another example which has come to our attention is that of sports clubs or leagues which make available play-by-play broadcasts of their teams in consideration of the stations' agreements to carry the broadcasts in full, including commercial matter.

6. We wish to make clear, as we stated in our Public Notice of March 2, 1973, that:

> Nothing in this notice should be interpreted to place any limitation on the licensee's discretion to delete any material that it believes to be indecent, profane, obscene, in bad taste, or otherwise contrary to the public interest. The Notice is intended to emphasize that such deletions or cancellations should be accurately disclosed in the certifications to the network. This Notice is not to apply to clipping of a few seconds duration that occasionally results from switching or other technical problems. Finally, this notice is directed toward the obligations of the licensee. The licensee is not responsible for material deleted by the network; for example, the editing of films by a network to conform to time requirements, or returning to a sports event after a network commercial when play was resumed during the commercial.

7. In view of the above, we propose to amend § 73.1205 of the rules by inserting therein a subsection (b) which would provide as follows:

> (b) Where a licensee and any program supplier have entered into a contract or other agreement obligating the licensee to supply any document providing specified information concerning the broadcast of the program or program matter supplied, including noncommercial matter, the licensee shall not knowingly include in that document information required by the contract or agreement which is false.

8. We propose to re-designate the present rule as subsection (a), but to delete the last sentence of the present rule,[1] substituting therefor a new subsection (c) which would read as follows:

> (c) A licensee shall be deemed to have violated this section if it fails to exercise reasonable diligence to see that its agents and employees do not issue documents containing the false information specified in (a) and (b) above.

Although we previously have held that failure to exercise reasonable diligence constitutes a violation of the rule regardless of the licensee's lack of knowledge that false bills were being issued,[2] we believe it advisable to make the application of the rule more clear by addition of subsection (c).

9. When it adopted the original fraudulent billing rule, the Commission issued a Public Notice on "Applicability of the Fraudulent Billing Rule," containing eight illustrative examples of types of fraudulent billing to which the rule would apply. When the rule was clarified by the 1970 amendment, two more examples were added to the Public Notice. We now propose to add further examples illustrating the application of the proposed amendments to the rule, and to re-issue the Public Notice in its entirety for the convenience of licensees. Accordingly, a revised Public Notice is appended hereto along with the proposed revised rule for comments of interested parties. The 10 previously-released examples remain unchanged in the Notice as here revised, except for the Interpretation in Example 7, in which the licensee's obligation has been made more specific and less sweeping than before. The present language states that the practice described in Example 7 constitutes fraudulent billing "unless the dealer can provide satisfactory evidence that the manufacturer of 'Applicance A' is aware that the dealer

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[1] The present last sentence reads: "Licensees shall exercise reasonable diligence to see that their agents and employees do not issue any documents which would violate this section if issued by the licensee."

[2] Faulkner Radio, Inc., 25 FCC 2d 893 (1970), in which the Commission stated: "In order to affirm the forfeiture, it is not necessary to find that the principals of the licensee had direct knowledge of the fact that false affidavits were issued. In its prior Memorandum Opinion and Order, the Commission stated that "there was a clear indication of lack of diligence on the part of the licensee."

actually paid only $5 per spot because of the volume discount." We believe that the manufacturer will be sufficiently alerted to the possibility that the dealer may obtain a discount if the licensee prints or stamps on the face of the affidavit of performance a statement such as "Rate subject to volume discount to dealer."

10. Pursuant to applicable procedures set forth in § 1.415 of the Commission's rules and regulations, interested parties may file comments on or before August 29, 1975, and reply comments on or before September 29, 1975. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision in this proceeding, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this Notice.

11. Authority for the amendments proposed herein is contained in sections 4(i) and 303(r) of the Communications Act of 1934, as amended.

12. In accordance with the provisions of § 1.419 of the rules, an original and 14 copies of all comments, replies, pleadings, briefs, and other documents shall be furnished to the Commission. Responses will be available for public inspection during regular business hours in the Commission's Broadcast and Docket Reference Room at its Headquarters in Washington, D.C.

Adopted: May 29, 1975.

Released: June 25, 1975.

FEDERAL COMMUNICATIONS COMMISSION,[3]
[SEAL] VINCENT J. MULLINS,
Secretary.

1. Section 73.1205 is amended to read as follows:

§ 73.1205 Fraudulent billing practices.

(a) No licensee of a standard, FM, or television broadcast station shall knowingly issue to any local, regional or national advertiser, advertising agency, station representative, manufacturer, distributor, jobber or any other party, any bill, invoice, affidavit or other document which contains false information concerning the amount actually charged by the licensee for the broadcast advertising for which such bill, invoice, affidavit or other document is issued, or which misrepresents the nature or content of such advertising, or which misrepresents the quantity of advertising actually broadcast (number or length of advertising messages) or the time of day or date at which it was broadcast.

(b) Where a licensee and any program supplier have entered into a contract or other agreement obligating the licensee to supply any document providing specified information concerning the broadcast of the program or program matter supplied, including noncommercial matter, the licensee shall not knowingly include in that document information required by the contract or agreement which is false.

(c) A licensee shall be deemed to have violated this section if it fails to exercise reasonable diligence to see that its agents and employees do not issue documents containing the false information specified in paragraphs (a) and (b) of this section.

NOTE: Commission interpretations in connection with the rule may be found in the attached Public Notice entitled "Applicability of the Fraudulent Billing Rule."

COMMISSION ISSUES REVISED LIST OF EXAMPLES OF APPLICABILITY OF THE FRAUDULENT BILLING RULE

On October 20, 1965, the Commission amended Part 73 of its rules and regulations to prohibit fraudulent billing practices by broadcast licensees. At the same time, it issued a Public Notice containing illustrative examples of certain kinds of fraudulent billing practices with which the Commission was familiar. It cautioned that "Since fraudulent billing practices may take many forms, the following list of examples should not be considered all-inclusive." 1 FCC 2d 1068, 1075. The fraudulent billing rule, now designated as § 73.1205 of the Commission's rules and regulations, was amended on May 13, 1970 to clarify its meaning and the previously-issued Public Notice was correspondingly amplified with two new examples. 23 FCC 2d 70.

The Commission has now adopted a notice of proposed rulemaking which would further amend § 73.1205. In view of the proposed amendments, it is appropriate to add corresponding illustrative examples to the previously issued Public Notice and to issue a revised and consolidated Notice incorporating the additions adopted in 1970 as well. The examples which follow are, like those proviously released, not to be considered all-inclusive but merely illustrative of the application of the rule to some practices. The ten examples previously issued are incorporated herein in their original form except for a revision of the Interpretation of the rule as it applies to the situation described in Example 7.

EXAMPLES

1. A licensee issues a bill or invoice to local dealer for 50 commercial spots at a rate of $5 each for a total of $250. In connection with the same 50 commercial spots, the station also supplies the local dealer or an advertising agency, jobber, distributor, or manufacturer of products sold by the local dealer, another affidavit, memorandum, bill, or invoice which indicates that the amount charged the local dealer for the 50 spots was greater than $5 per spot.

Interpretation. This is fraudulent billing, since it tends to deceive the manufacturer, jobber, distributor or advertising agency to which the inflated bill eventually is sent, as to the amount actually charged and received by the station for the advertising.

2. A licensee issues a bill or invoice to a local dealer for 50 commercial spots at $5 each and the bill, invoice or accompanying affidavit indicates that the 50 spots were broadcast on behalf of certain cooperatively advertised products, whereas some of the spots did not advertise the special products, but were used by the local dealer solely to advertise his store or products for which cooperative sponsorship could not be obtained.

Interpretation. This is fraudulent billing, even though the station actually received $5 each for the 50 spots, because, by falsely representing that the spots advertised certain products, the licensee has enabled the local dealer to obtain reimbursement from the manufacturer, distributor, jobber or advertising agency for advertising on behalf of its product which was not actually broadcast.

3. A licensee sends, or permits its employees to send, blank bills or invoices bearing the name of licensee or his call letters to a local dealer or other party.

Interpretation. A presumption exists that licensee is tacitly participating in a fraudulent scheme whereby a local dealer, advertising agency or other party is enabled to deceive a third party as to the rate actually charged by licensee for advertising, and thereby to collect reimbursement for such advertising in an amount greater than that specified by the agreement between the third party and the local dealer. It is the licensee's responsibility to maintain control over the issuance of bills and invoices in the licensee's name, to make sure that fraud is not practiced.

4. A licensee submits bills or invoices to an advertising agency, station representative, or other party indicating that licensee's rate per spot is $50, whereas the licensee actually receives only $5 or $10 per spot in actual payment from the agency, representative or other party. Licensee claims that the remaining 80 or 90 percent of its original invoice has been deducted by the agency as "commission" and therefore no "double billing" is involved.

Interpretation. This is fraudulent billing. The agency discount does not customarily exceed 15 percent and the supplying of bills and invoices by the licensee to agencies which indicate that the licensee is charging several times as much for advertising as he actually receives constitutes participation in a fraudulent scheme.

5. A licensee submits a bill or invoice to a local dealer or other party for 50 commercial spots at $5 for a total of $250. However, the bottom of the bill or invoice carries an addendum so placed that it may be cut off of the bill or invoice without leaving any indication that the invoice originally carried such an addendum. The addendum specifies a "discount" to the advertiser based on volume, frequency or other consideration, so that the amount actually billed at the bottom of the page is less than $5 for each spot.

Interpretation. The preparation of bills or invoices in a manner which seems designed primarily to enable the dealer to deceive a cooperative advertiser as to the amount actually charged for cooperative advertising raises a presumption that the licensee is participating in a "double billing" scheme.

6. A licensee submits a bill or invoice to a local dealer for 50 spots involving cooperative advertising of a certain product or products at a rate of $5 each and actually collects this amount from the dealer. However, as a bonus the licensee "gives" the dealer 50 additional spots in which the product or products named on the original invoice are not advertised, so that the dealer actually obtains the benefit of 100 spots in return for payment to the station of the $250 billed for the 50 cooperative spots.

Interpretation. If the 50 "bonus" spots were broadcast as the result of any agreement or understanding expressed or implied, that the dealer would receive such additional advertising in return for contracting for the first 50 spots at $5 each, the so-called "bonus" spots were, in fact, a part of the same deal, and the licensee, by his actions, is participating in a scheme to deceive or defraud a manufacturer, jobber, distributor or advertising agency.

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[3] Separate statement of Chairman Wiley joined in by Commissioners Lee, Reid, Quello and Robinson filed as part of the original document. Commissioners Hooks and Washburn absent.

7. A local appliance dealer agrees to purchase 1,000 spots per year from a station and thereby earns a discount which reduces his rate per spot from $10 to $5. During the course of the year, the dealer purchases 100 spots from the station which advertises both the dealer and "Appliance A" and for which the dealer pays $5 per spot. Since the station's rate per spot for 100 spots is $10, the dealer asks the station to supply him with an invoice for the 100 spots on behalf of "Appliance A" at $10 per spot, claiming that if the manufacturer of the appliance had purchased the 100 spots, or if the dealer himself had purchased only these 100 spots within the course of a year, the $10 rate would apply, and that, therefore, the manufacturer should be required to reimburse the dealer at the $10 rate.

Interpretation. This practice constitutes fraudulent billing unless the licensee makes certain that the manufacturer of "Appliance A" is alerted to the fact or possibility of the dealer's earning a volume discount. Thus, unless the dealer provides satisfactory evidence that the manufacturer is aware that the dealer actually paid only $5 per spot, the licensee should print or stamp a statement on the face of the affidavit of performance which is to be forwarded to the manufacturer. The statement might be, for example, "RATE SUBJECT TO VOLUME DISCOUNT TO DEALER."

8. A licensee issues a bill or invoice to a dealer for commercial spots which were never broadcast.

Interpretation. This practice, prima facie, involves fraud, either against the dealer or against a third party which the dealer expects to provide partial reimbursement for the nonexistent advertising.

9. A licensee knowingly issues a bill or invoice to a local or national advertiser which shows broadcast of commercial announcements 1 minute in length, whereas in fact some of the announcements were only 30 seconds in length.

Interpretation. This is fraudulent billing, since it misrepresents the length of the commercials, a highly important element of the price charged for them.

10. A licensee knowingly issues a bill or invoice to a local or national advertiser which sets forth the time of day or date on which commercial announcements were broadcast, whereas in fact they were presented at a different time or on a different day, or were not broadcast at all.

Interpretation. This is fraudulent billing, since time of broadcast is often highly important in its value and the price charged for it. Charging for advertising not broadcast is clearly fraudulent.

11. The licensee of a station affiliated with a network furnishes a written certification that the station has broadcast a certain network program in full, whereas in fact the station has not broadcast a part of the advertising content of the program, or has failed to broadcast a portion of the program other than advertising.

Interpretation. Falsely certifying to the network that a network program was broadcast in its entirety constitutes a violation of § 73.1205(b) of the rules, regardless of whether the matter not broadcast consists of advertising or other matter.

12. A licensee enters into a barter agreement with a program supplier whereby the licensee agrees to broadcast the entire program as furnished by the supplier, including commercial spots which the supplier already has sold. The station itself is permitted to sell a number of additional spots for insertion in the program. The station is required by its agreement with the syndicator or supplier to furnish a statement as to whether each program was broadcast in full as furnished by the supplier. Although the station furnishes certification that the program was broadcast in its entirely, it has in fact omitted portions of either the commercial or noncommercial segments of the program.

Interpretation. As in example 11 above, such false certification constitutes a violation of § 73.1205(b) of the rules.

13. Although principals of the licensee are unaware of the fact, one or more station employees are either intentionally or because of carelessness issuing false bills, invoices, affidavits, certifications or other documents such as are described in § 73.1205(a) or (b). For example, an employee is issuing bills based upon advertising contracts or "start orders" without checking the program logs for the period covered by the bills to make sure that the advertising actually was broadcast as represented in the bills. Principals of the licensee are unaware of this practice but have not exercised reasonable diligence to see that their employees do not engage in such practices, which have been proved by experience to be likely to result in issuance of false bills or invoices.

Interpretation. Whether the licensee's agent or employee is intentionally or only carelessly issuing false bills, the licensee will be deemed to have violated § 73.1205 unless it exercises reasonable diligence to prevent such practices.

[FR Doc.75-16314 Filed 6-24-75;8:45 am]

[47 CFR Part 73]

[Docket No. 20501; FCC 75-643]

BROADCAST LICENSEES

Prohibition Against Distortion of Audience Ratings

In the matter of amendment of Part 73 of the Commission's rules and regulations to prohibit distortion of audience ratings, Docket No. 20501.

1. Notice of proposed rulemaking is hereby given in the above-entitled matter.

2. For many years, the Commission has cautioned broadcast licensees against distortion of audience ratings of radio or television programs or stations. We have issued two Public Notices on this subject, dated June 13, 1963 (FCC 63-544), and October 27, 1965 (1 FCC 2d 1078), which are attached below as Appendices A and B. In some cases, the Commission has issued letters of admonition. In others, it has granted short-term renewals. (Star Stations of Indiana, Inc., 3 RR 2d 745 (1964); Western Broadcasting Co., 14 FCC 2d 267 (1968); and Marsh Media, Ltd., 38 FCC 2d 457 (1972).) It also has designated issues of ratings distortion in hearing orders. (KFPW Broadcasting Co., 16 FCC 2d 681 (1969); Hertz Broadcasting of Birmingham, Inc., FCC 73-1195, 38 FR 33322 (1973).) Despite the past efforts of the Commission to prevent rating distortion, the practice continues and complaints recently received indicate that it may be increasing. Therefore, we propose to adopt rules prohibiting distortion of ratings as contrary to the public interest and an unfair and deceptive business practice which raises questions as to the qualifications of a licensee or permittee to continue to hold a license or permit.

BACKGROUND OF THE PROBLEM

3. Audience surveys are conducted by rating services to determine what percentage of the total potential radio or television audience is or has been viewing or listening to a particular program or station.[1] Audience ratings so obtained have been used by licensees and networks to determine the relative popularity of their programs, and have been relied upon extensively by advertisers in determining what programs to sponsor.

4. In an effort to gain an unfair advantage over competitors, some licensees and permittees have engaged in special promotions during or preceding the period in which an audience survey was being conducted, in order to bring about a temporary increase in the station's rating and thus to create a false impression that the station's normal audience is larger than it is. Such promotions have included contests, special give-away schemes rewarding the public for tuning to the station, and vastly increased advertising campaigns timed to coincide with or precede a rating period.

5. In addition to the above practices, some licensees have engaged in promotions designed to cause, or, at least, likely to have the effect of causing, members of the public falsely to state, when approached by a rating service, that they prefer or regularly listen to or view a particular station. One example of such an activity is the "Don't Say Hello" contest, wherein a station announces or advertises that if it telephones a home and the person answering the telephone says "I listen to Station XXXX" (instead of "Hello"), a prize will be awarded to that person. The same result may be sought by interviewing persons on the street, asking them to name their favorite station and then rewarding those who name the station conducting the promotion. When the interviews with winning interviewees are later broadcast, the probable result is to cause persons hearing the boardcasts to answer falsely any questions put to them by rating services, in the belief that the questions are a part of a particular station's promotion and that answering with the call letters of the station will win a prize.

6. Still another unfair and deceptive practice consists of making false or misleading claims of a station's popularity or coverage area based on audience ratings which themselves may be accurate. Thus,

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[1] Such surveys have been or are being conducted by means which include (i) telephoning persons at random to ask whether their radio or TV set is in use and if so, the identity of the station to which it is tuned; (ii) interviewing persons at their homes or elsewhere as to the programs or stations which they recently tuned in; (iii) having members of the public fill in "diaries" which list the stations and programs viewed or listened to during a specified period; (iv) installing metering devices in radio or TV sets which record the times when the sets are in use and the stations to which they are tuned.

a station may claim to be "Number One" in its market whereas the audience survey shows it to be first only during certain times of day or within only a particular segment of the audience. Some stations have circulated survey results purportedly based on recent surveys when in fact the survey quoted is several years old or has been superseded by a later report encompassing the same area. Still another example of misleading use of survey results is failure to disclose that the figures cited are only estimates, or are based upon estimates, and are not accurate to any precise mathematical degree unless based upon a true probability sample.

7. The Special Subcommittee on Investigations of the House Committee on Interstate and Foreign Commerce held extensive hearings on the subject of audience surveys in 1963 and 1964. The Report of the Subcommittee (House Report No. 1212, 89th Congress, 2d Session) stated (p. 2) that "false or misleading audience measurement ratings must be exposed." The Report continued:

> Rightly or wrongly, sponsors react to the audience rating systems. Millions of dollars turn on the rating levels. The immediate and long-range future of all types of programs * * * are controlled by the ratings which each show receives. If this rating system is to continue we must make certain that the rating received is the rating achieved—no more, and no less.
>
> If public reaction is an appropriate measure, then the public reaction should be free from any tampering or adjustment for private purposes. If public surveys are to be used to determine where, when, and what will be broadcast, we must assure that such surveys are not misused.
>
> The broadcasting industry as a whole shares this responsibility * * *.

8. The Report further stated (pp. 10–11) that both the FCC and the Federal Trade Commission "have important statutory responsibilities under their organic acts with regard to broadcast rating services," and continued:

> The two agencies have recognized that they have a joint responsibility in these areas which requires proper coordination. On June 13, 1963, the two agencies issued separate coordinated policy statements regarding their respective responsibilities in connection with broadcast ratings. The FCC statement stressed that broadcasters must act responsibly in using ratings. They must take reasonable precautions to insure that surveys used in advertising campaigns are valid (e.g., that they are properly conceived, reasonably free from bias, and have adequate samples). Broadcasters also must refrain from quoting portions of surveys out of context so as to leave a false and misleading impression of the relative ranking of stations in their respective markets.
>
> The FCC stated that in determining whether a licensee is operating in the public interest, the Commission will take into account any FTC findings or order to cease and desist concerning the use of broadcast ratings by a licensee.
>
> The FCC also stressed that ordinarily it intends to refer complaints dealing with questionable use of broadcast ratings to the FTC as the agency having primary responsibility in this respect.
>
> The FTC stated that it would take vigorous action against any broadcaster who claims that a survey proves he has a certain percentage of the listening audience if upon investigation it is found that the claim is false and deceptive.

The FCC Public Notice of June 13, 1963 (FCC 63-544) mentioned above is appended below as Appendix A. The Subcommittee Report also took note of a further FTC statement issued on July 8, 1965, which the FCC appended to a second Public Notice of its own issued October 27, 1965 (1 FCC 2d 1078) (Appendix B), which was sent to all broadcast licensees. The 1965 Notice stated that this Commission "generally intends to continue to refer complaints dealing with the use of broadcast ratings to the Federal Trade Commission for its consideration," and that "In determining whether a licensee is operating in the public interest, we will take into consideration his operation under the guidelines set forth in the FTC statement of July 8, 1965, as well as any findings or orders to cease and desist of the FTC."

9. Finally, in its "Summary and Recommendations," the House Subcommittee stated in part on p. 21:

> (2) The Communications Act of 1934 and the Federal Trade Commission Act give to the FCC and the FTC general responsibilities with regard to broadcasting, advertising, and unfair and deceptive practices. Effective enforcement of these laws with regard to the sale, advertising, and use of broadcast ratings is vital in the interest of the integrity of commercial broadcast operations. Proper coordination of law enforcement by these two agencies is vital if proper practices with regard to ratings are to prevail. * * *

10. We agree with the conclusions of the Subcommittee stated above. The programs that the American people see or hear are at least in part determined on the basis of audience ratings, and thus distortion or improper use of ratings bears directly upon the public interest being served by broadcast licensees. Distortion or misuse of ratings also raises questions as to the qualifications of a licensee or permittee. Such distortions have been held by the Federal Trade Commission to constitute unfair acts and practices in commerce in violation of section 5 of the Federal Trade Commission Act. (Cox Broadcasting Corp., 76 FTC 324 (1969); Gulf Union Corp., 78 FTC 211 (1971).)

PROPOSED RULE

11. In view of the fact that measures taken by this Commission thus far have failed to eliminate the practices described above, we believe it would be desirable to amend Part 73 of our rules and regulations to incorporate a new section prohibiting these practices. Such action on our part would more clearly define the practices which we believe contrary to the public interest, especially in view of the fact that we also propose to release a Public Notice setting forth illustrative examples of the application of the proposed rule to specific factual situations. We have adopted similar Public Notices in connection with our Rule on sponsorship identification[2] and our rule on fraudulent billing practices.[3] Moreover, adoption of a rule would widen the range of sanctions which could be imposed for such practices to include forfeitures. We stress, however, that we consider distortion of ratings to be a serious violation of a licensee's responsibility, and that where the violation appears to require stronger measures than imposition of a forefeiture, we intend to take them, including designation of a renewal application for hearing or issuance of an Order to Show Cause why a license should not be revoked. We ask comment from all interested parties, not only on the proposed Rule but on the proposed Public Notice, so that we may have the benefit of the thinking of such parties on both parts of our proposed action.

12. We wish to make clear that the proposed Rule, as indicated in Note 3, applies only to advertising, contest or promotional activity. Pursuant to the rule, a licensee continues to have full discretion in the selection of entertainment, public affairs, news and other programming. However, any contest or promotional activity incorporated in such programming would, of course, be subject to the provisions of the Rule.

13. Pending conclusion of this proceeding, we intend to continue to deal on an ad hoc basis with alleged distortion of ratings, including that aspect of the subject described in paragraph 5, above, and in Subsection (a) (2) of the proposed rule, imposing such sanctions as appear appropriate under our present policies.

14. Pursuant to applicable procedures set forth in § 1.415 of the Commission's rules and regulations, interested parties may file comments on or before August 29, 1975, and reply comments on or before September 29, 1975. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision in this proceeding, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this notice.

15. Authority for the amendments proposed herein is contained in sections 4(i) and 303(r) of the Communications Act of 1934, as amended.

16. In accordance with the provisions of § 1.419 of the rules, an original and 14 copies of all comments, replies, pleadings, briefs, and other documents shall be furnished the Commission. Responses will be available for public inspection during regular business hours in the Commission's Broadcast and Docket Reference Room at its Headquarters in Washington, D.C.

Adopted: May 29, 1975.

Released: June 25, 1975.

FEDERAL COMMUNICATIONS COMMISSION,[4]
[SEAL] VINCENT J. MULLINS,
Secretary.

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[2] Applicability of Sponsorship Identification Rules, 40 FCC 141 (1963).

[3] Applicability of Fraudulent Billing Rule, 23 FCC 2d 303 (1970).

[4] Commissioners Hooks and Washburn absent.

1. Section 73.1209 is added to read as follows:

§ 73.1209 Distortion of audience ratings.

(a) No licensee of a broadcast station shall by means of the following attempt to distort or engage in activities that do distort or may reasonably be expected to distort, the audience rating of its station or stations or the ratings of any of its programs:

(1) Any contest, promotional or advertising activity during or within a four-week period preceding an audience survey that is conducted within the licensee's city of license or adjoining communities when the activity is not conducted regularly throughout the year and at times unrelated to audience survey periods; and

(2) Any contest, promotional or advertising activity during or within the three months preceding an audience survey conducted within the licensee's city of license or adjoining communities, that causes, is designed to cause, or may reasonably be expected to cause, members of the public to report to a rating service that they prefer the licensee's station, or listen to or view the station or any of its programs, more than they do in fact. Any contest, promotional or advertising activity in which persons are rewarded for stating that they listen to, view or prefer the licensee's or permittee's station or its programs shall be presumed to be designed to cause members of the public to report to a rating service that they prefer the licensee's station, or listen to or view the station or any of its programs, more than they do in fact.

(b) Licensees of broadcast stations that conduct contests, promotions or advertising activities shall exercise reasonable diligence to ascertain when audience surveys will be conducted in the pertinent communities.

(c) No licensee of a broadcast station shall cite or quote from an audience survey or survey data in such a way as to create a misleading impression of the results of the survey, as by unfairly basing audience claims on results achieved only during a certain period of the broadcast day, or on a survey of only a segment of the total potential audience, or on data obtained in the survey that the licensee knows or has reason to know was not designed, conducted and analyzed in accordance with accepted statistical principles and procedures, reasonably free from bias and based on a properly selected sample of adequate size. No licensee of a broadcast station shall base any claim on survey reports or data that do not reliably reflect current size of audience, either because the passage of time has made the data outdated or because a later survey encompassing the same area has been published, or for any other reason. No licensee of a broadcast station shall make any claim as to audience size or coverage without disclosure that any figures cited or quoted are estimates only or are based upon estimates.

NOTE 1. Commission interpretations in connection with this Rule may be found in the attached Public Notice entitled "Applicability of Rule Prohibiting Distortion of Audience Ratings."

NOTE 2. *Definitions.* An "audience survey" is any method or procedure by which data are obtained concerning the television or radio viewing or listening habits or preferences of members of the public. An "audience rating" is the estimated percentage of persons or households comprising the audience of broadcast stations or networks or their programs, compared to the total potential of persons or households, based upon data obtained in an audience survey. A "rating service" is any person, firm or other entity which conducts audience surveys by any method. A "survey period" is the period of time during which a rating service attempts to ascertain the program or station viewing or listening habits of members of the public.

NOTE 3. The phrases "contest," "promotional activity," and "advertising activity" do not include entertainment programming or public affairs, news or other informational programming.

APPENDIX A

[FCC 63-544; 36511; Public Notice—B]

BROADCAST LICENSES CAUTIONED ABOUT IMPROPER USE OF BROADCAST RATINGS

JUNE 13, 1963.

As a part of its continuing liaison with the Federal Trade Commission, this Commission, has determined that notice should be given to its broadcast licensees concerning possible improper use of broadcast ratings in advertising campaigns.

Information has come to the attention of the Commission, as a result of hearings recently held by the Special Subcommittee on Investigations of the House Committee on Interstate and Foreign Commerce and through complaints, that some licensees have made improper use of broadcast ratings. The Commission recognizes, of course, that audience research is an important selling tool in efforts to obtain advertiser support. It is not the intention of the Commission to discourage valid audience research or its proper use by broadcast licensees in their selling campaigns.

In using audience research, however, the licensee must act responsibly. He therefore has an obligation to take reasonable precautions to insure that a survey which he uses in an advertising campaign is valid (e.g., that it is properly conceived, reasonably free from bias, has an adequate sample). He also has an obligation to act responsibly in the use he makes of the survey. He may not, for example, quote a portion of the survey out of context so as to leave a false and misleading impression of the relative ranking of his station in the market.

As is made clear in the Public Notice issued this day by the Federal Trade Commission, failure to act responsibly may constitute an unfair method of competition, or an unfair or deceptive act or practice in violation of the Federal Trade Commission Act. The Commission intends ordinarily to refer complaints dealing with questionable use of broadcast ratings to the Federal Trade Commission for that agency's consideration.

In determining whether a licensee is operating in the public interest, the Commission will take into account any findings or order to cease and desist of the Federal Trade Commission concerning the use of broadcast ratings by a licensee.

Adopted: June 12, 1963.

[FCC 65-965; 74233; Public Notice]

COMMISSION CALLS ATTENTION OF LICENSEES TO FTC STATEMENT ON BROADCAST RATINGS[1]

OCTOBER 28, 1965.

On July 8, 1965, the Federal Trade Commission issued a statement regarding deceptive claims of broadcast audience coverage and setting forth certain basic guidelines to be followed in order to avoid such deception.

In furtherance of its continuing liaison with the FTC, this Commission calls the attention of broadcast licensees to this statement. As we stated in our Public Notice of June 13, 1963 (FCC 63-544), we do not intend to discourage valid audience research or its proper use, but we wish to remind licensees that they must act responsibly in using such research.

The Commission generally intends to continue to refer complaints dealing with the use of broadcast ratings to the Federal Trade Commission for its consideration. In determining whether a licensee is operating in the public interest, we will take into consideration his operation under the guidelines set forth in the FTC statement of July 8, 1965, as well as any findings or orders to cease and desist of the FTC. In order that all broadcast licensees may be fully informed of the contents of the FTC statement, a copy of it is attached to this Public Notice.

Adopted: October 27, 1965.

FTC ISSUES STATEMENT REGARDING DECEPTIVE CLAIMS OF BROADCAST AUDIENCE COVERAGE

The Federal Trade Commission today issued the following statement regarding deceptive claims of broadcast audience coverage.

Investigations by Congress and by the Commission have disclosed widespread misuse of audience survey results, use of unreliable survey data, and tampering with and distortion of survey results, which has resulted in deception as to the size, composition, and other characteristics of radio and television audiences. These matters are of course important to advertisers in these media.

The Commission believes that, to avoid such deception, television and radio broadcasters, other persons selling advertising or broadcasting time or programs, advertising agencies, and advertisers should, in making claims based on survey results or data, observe the following basic guidelines.

1. A person (or firm) making a claim concerning the size, composition or other important characteristics of a listening or viewing audience is responsible for seeing to it that the claim is truthful and not deceptive. If he bases his claim on the results of an audience survey, he assumes responsibility for interpreting the data accurately. Thus, he should not engage in activities calculated to distort or inflate such data—for example, by conducting a special contest, or otherwise varying his usual programming, or instituting unusual advertising or other promotional efforts, designed to increase audiences only during the survey period. Such variation from normal practices is known as "hypoing."

It is also improper to cite or quote from a survey report or survey date in such a way as to create a misleading impression of the results of the survey, as by unfairly basing audience claims on results achieved only during certain periods of the broadcast day or on a survey of only a segment of the total potential audience.

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[1] Commissioner Hyde absent.

2. Audience data are based on sample surveys not derived from complete measurements of audiences. As such, they are statistical estimates, and, at best, are of only limited reliability due to errors and distortions inherent in the statistical methods yielding such data. Claims as to audience coverage based on audience surveys should therefore be qualified in recognition of the fact that survey data are inherently imperfect. Any such claim should be accompanied by a disclosure that any figures cited or quoted are estimates only or are based upon estimates, and are not accurate to any precise mathematical degree unless based upon a true probability sample. Audience surveys are not in practice based upon true probability samples.

3. Such claims should not be based on data obtained in a survey that the person (or firm) making the claim knows or has reason to know was not designed, conducted, and analyzed in accordance with accepted statistical principles and procedures, reasonably free from avoidable bias, and based on a properly selected sample of adequate size. Such claims should not be based on survey reports or data that do not reliably reflect current audience coverage, either because the passage of time has made the data outdated, or because a later survey report encompassing essentially the same area has been published, or because of the entry or departure of a competitor, or for any other reason.

These guidelines are offered to broadcasters and others concerned for consideration in avoiding possible violation of the Federal Trade Commission Act.

APPLICABILITY OF PROPOSED RULE PROHIBITING DISTORTION OF AUDIENCE RATINGS

The Commission on this date has released a Notice of Proposed Rule Making to prohibit distortion of audience ratings by broadcast licensees or permittees.

In order to assist licensees, permittees and others in interpreting the proposed rule, we believe it advisable to set forth certain examples of practices which the rule would or would not prohibit. The following examples are not intended to be all-inclusive, and other kinds of practices to which the rule would apply doubtless exist. The practices set forth herein are designed merely to illustrate some activities which already have come to the attention of the Commission.

A. EXAMPLES OF ACTIVITIES TO WHICH SUBSECTION (a) (1) OF THE PROPOSED RULE REFERS

(1) Station XXXX, which conducts few if any contests during the remainder of the year, begins a contest offering substantial prizes to the winners during or within four weeks preceding the period in which a rating service conducts a survey in the station's city of license or an adjoining community.

RULING. Such activity by the station may reasonably be expected to distort its audience rating beyond that which would normally be obtained, and therefore is prohibited.

(2) Station XXXX conducts contests throughout the year on a regular basis. However, during or within the four weeks preceding a rating period, the station greatly increases the value of the prizes offered to the public in the contest or contests then being conducted.

RULING. As in (1) above, such activity may reasonably be expected to cause a distortion of the station's normal rating, and therefore is prohibited.

(3) Station XXXX, which engages in little if any audience promotion or advertising activity during the remainder of the year, launches a substantial campaign of this kind during or within the four weeks preceding a rating period. This may include a marked increase in billboard, newspaper or direct mail advertising.

RULING: Such substantially increased advertising or other promotional activity may reasonably be expected to distort the station's rating and therefore is prohibited.

(4) Station XXXX conducts contests and engages in other audience promotion or advertising activity throughout the year on a regular basis not timed to coincide with audience rating periods, and there is no increase in the number of contests, the value of prizes offered therein, or other promotional or advertising activity during or within the four weeks preceding a rating period.

RULING: It cannot be said that the station is attempting to inflate its ratings beyond those normally obtained during the year, nor that the station's activities may reasonably be expected to have such a result. Therefore, the station's practices are not prohibited by the Rule.

(5) Station XXXX sends out "questionnaires" to many thousands of persons in its coverage area during or within four weeks preceding a rating period, asking recipients of the questionnaires to comment on one or more of its new programs or its new format or a new anchorman or the increase of the use of film in its news programs. The station has not engaged in this activity in other, non-rating parts of the year.

RULING: This appears to be, in essence, a form of direct mail advertising, which is calculated or likely to cause a temporary increase in the audience of the station or one or more of its programs. Therefore, the practice is prohibited.

B. EXAMPLES OF ACTIVITIES TO WHICH SUBSECTION (a) (2) OF THE PROPOSED RULE REFERS

(6) Station XXXX conducts a "Don't Say Hello" type of telephone contest during or within three months preceding a rating period, in which members of the public are called and if they answer the telephone by saying "I listen to XXXX" or "XXXX is my favorite station" or by making some similar statement, they are awarded prizes by the station.

RULING: The Commission believes that all contests and promotions of this kind are likely to destroy the integrity of audience surveys conducted by certain methods, in that the promotions are likely to cause members of the public falsely to name stations conducting the promotions as their favorite stations, in the belief that by doing so they may win a prize. Therefore such contests or promotions, if conducted during or within the three months preceding a rating period, are prohibited.

(7) Station XXXX does not conduct a telephone promotion such as that described in (6) above, but it sends announcers out on the streets or to other public places to interview members of the public as to their favoriate stations or programs. If the persons interviewed state that their favorite station is XXXX, they are rewarded with a prize. If they answer with the call letters of another station, they receive nothing or a much smaller prize. Tape-recorded interviews with the persons who have named XXXX as their favorite station are later broadcast.

RULING: As in example (6), the promotion appears designed or likely to cause members of the public falsely to respond with the call letters of XXXX if they are later questioned by employees of a rating service. Accordingly, the practice is prohibited.

(8) Station XXXX broadcasts announcements urging its listeners or viewers to fill in their rating service "diaries" and return them promptly to the rating service.

RULING: Regardless of whether the station also urges or suggests that its audience fill in the diary with the names of its own programs, such announcements appear likely to distort the rating of XXXX, since only listeners or viewers of XXXX hear the announcements. If the announcements have any effect whatever, the effect will be to induce the audience of XXXX to be more diligent in filling out and returning its rating service diaries than will other recipients of diaries who do not listen to or view XXXX. Therefore, this practice is prohibited.[1]

C. ACTIVITIES TO WHICH SUBSECTION (B) OF THE PROPOSED RULE REFERS

(9) Station XXXX subscribes to Rating Service A and knows when its surveys are to be conducted in the city of license of XXXX or adjoining communities. Station XXXX also is aware that Rating Service B conducts audience surveys in its city of license or adjoining communities, even though XXXX does not subscribe to Rating Service B. Are the provisions of the proposed rule also applicable to the audience surveys of Rating Service B?

RULING: Yes. Subsection (b) requires XXXX to exercise reasonable diligence to ascertain when audience surveys are to be conducted in the pertinent communities.

D. EXAMPLES OF ACTIVITIES TO WHICH SUBSECTION (C) OF THE PROPOSED RULE REFERS

(10) An audience rating in Station XXXX's coverage area is conducted in 1972. In 1975, XXXX makes use of the results of the 1972 survey without clearly revealing to all persons contacted that it was conducted in 1972.

RULING: This is a misleading use of survey results and is prohibited under Subsection (c).

(11) An audience survey indicates that Station XXXX was rated first in its community during the hours 7 p.m. to midnight, but had a lower rating at other times of the day. Station XXXX makes claims to the public, advertisers or advertising prospects that it is "No. 1."

RULING: This is a deceptive practice, prohibited by the Rule. Similarly, a claim of being "No. 1," without proper qualifying language, would be in violation if the station's "No. 1" rating were only among members of a certain age, sex, economic or educational group.

(12) Station XXXX conducts its own survey and releases the results without revealing that the survey was so conducted.

RULING: This is a deceptive practice. All survey results released should identify the party which conducted the survey, as well as the date of the survey, the area surveyed, size of sample, etc.

(13) Station XXXX contracts or subscribes to a survey conducted by another party, although it knows or has reason to suspect that the survey was not designed, conducted and analyzed in accordance with accepted statistical principles and procedures, or was not based on a properly selected sample of ade-

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[1] House Report No. 1212, 89th Congress, 2d Session, issued after hearings on audience ratings were held by the Special Subcommittee on Investigations of the House Committee on Interstate and Foreign Commerce, noted that audience rating services expect a certain amount of "non-cooperation" from members of the public and that the rating services factor this in to the design and analysis of their surveys. By urging listeners to "cooperate," a station is encouraging more responses from its own segment of the general audience than normally would be forthcoming and therefore is engaging in an activity likely to distort the result of the survey.

quate size, or was not reasonably free from bias. XXXX then releases the results of the survey.

RULING: The release of the results of such survey would be a misleading use thereof and would be prohibited.

(14) Station XXXX releases survey results without disclosure that the figures cited are only estimates. Or, instead of citing the figures, it claims to be "No. 1" based upon figures which are only estimates.

RULING: Both practices are misleading uses of a survey and are prohibited under Subsection (c).

[FR Doc.75-16316 Filed 6-24-75;8:45 am]

[47 CFR Parts 2, 83]

[Docket No. 19946; FCC 75-684]

NON-GOVERNMENT SHIP STATIONS; SEARCH AND RESCUE COMMUNICATIONS

Terminating Proceeding

By the Commission: Commissioner Quello absent. 1. A Notice of proposed rule making in the above-captioned matter was released on March 6, 1974, and was published in the FEDERAL REGISTER on March 11, 1974 (39 FR 9462). The First Report and Order was released on November 29, 1974, and was published in the FEDERAL REGISTER on December 6, 1974 (39 FR 42689). A further notice of proposed rule making was released on November 29, 1974, and was published in the FEDERAL REGISTER on December 5, 1974 (39 FR 42380). In response to a request by the North Pacific Marine Radio Council, the Commission released its Order on February 4, 1975, extending the time for filing comments and reply comments to February 19, 1975, and March 3, 1975, respectively. The dates for filing comments and replies have passed.

2. Comments were filed by: James C. Acheson (Acheson), Hawaiian Marine Radio Council (HMRC), Northern California Marine Radio Council (NCMRC), North Pacific Marine Radio Council (NPMRC), Southern California Marine Radio Council (SCMRC), George H. Caffrey, Chairman of the Radio Technical Committee of the United States Power Squadrons (RTC-USPS), and Yarrow Bay Yacht Club (YBYC).

3. In its further notice of proposed rule making, the Commission stated that it "is not satisfied that the comments filed did, in fact, provide a representative cross-section of the recreational boating public to adequately serve as the basis for an affirmative finding that the fitting of 157.1 MHz should be on a mandatory basis." The further notice of proposed rule making was released with the objective of eliciting these comments, directed to the specific proposal:

> Should (all) recreational (non-commercial) vessels of 65 feet and less in length, which are VHF equipped, be required to fit for the use of 157.1 MHz on a mandatory basis.

4. The comments filed provide excellent response from the West Coast and Hawaii. They provide almost no response from the East Coast, except to the extent that the view expressed by the Radio Technical Committee, U.S.P.S., reflects such view. Considering the thousands of boats on the East Coast which employ VHF, we are skeptical that the members of the RTC-USPS provide an adequate sampling to be truly representative of the majority view of the boating public on the East Coast. No comments were received from the Gulf Coast.

5. The replies to the above specific proposal are as follows: In favor of mandatory fitting of 157.1 MHz: Acheson, RTC-USPS and SCMRC. Opposed to the mandatory fitting of 157.1 MHz: HMRC, NCMRC, NPMRC and YBYC. While the reasons supporting the mandatory fitting of 157.1 MHz were amply documented in the further notice of proposed rule making, and there is no reason to repeat them here, the reasons in opposition to the fitting of 157.1 MHz have not been reported. The case against the mandatory fitting of 157.1 MHz, as set forth in the comments, is as follows:

> To fit 157.1 MHz it would be necessary, in limited channel sets, to remove a present working channel, which would prevent the vessel from adequately meeting its operational needs, or reduce the usefulness of the ship station.
>
> There are many recreational vessels which would have little or no need to communicate with the USCG except when in distress.
>
> There are many recreational vessel operators who, although they do have some needs for working communications to or from the USCG, would . . . elect to fulfill these needs by means other than dedication of a whole channel for that purpose, e.g., via a public coast station or a limited coast station, if appropriate, by means of 2670 kHz, acquisition of marine information broadcasts by use of a separate receiver, acquisition of weather information from National Weather Service broadcasts, etc.
>
> It is not reasonable to require, without exception, that those who do not need 157.1 MHz install it, just because there are many others who have a compelling need for it.
>
> There is doubt that fitment of 157.1 MHz by every recreational vessel will clear the occupancy of 156.8 MHz. There are a large number of users and a wide variety of purposes served by the use of 156.8 MHz. Available information indicates that the relief provided on 156.8 MHz will be very small when considered as a percentage.
>
> Users are disturbed about proliferation of FCC and USCG regulations which contain mandatory features, compliance with which is costly or places undue demands upon citizens' time and sometimes yields but minimal benefits.
>
> The indirect effect of adoption of the proposed rule would be that in many cases the Commission will have ordered the licensee to double his investment or, will have ordered him to abandon an existing needed channel. In transceivers having a limited number of channels, each mandatory channel subtracts from the choices previously available for other purposes and thus may generate otherwise unneeded additional investment or suppression of needs.

6. The commenters opposing the mandatory fitting of 157.1 MHz agree that dealers, manufacturers, marine radio councils, Government agencies, et al., should encourage the fitting of 157.1 MHz. YBYC adequately sums up the situation in their comment: * * * boaters, as a group, are cooperative and will, over the years, install channel 22A (157.1 MHz) on 95 percent of their boats. The other 5 percent will have good personal reasons for not having that channel.

7. It is the view of this Commission that it is not appropriate or necessary that we amend the rules to require the fitting of 157.1 MHz on a mandatory basis. As the commenters have stated, those recreational boats having a need to employ 157.1 MHz will finds ways and means to make it available, while others having inadequate or no need will employ the channels available in their VHF transceivers for other purposes. We fully subscribe to the belief that all segments of the maritime community should urge the fitting of 157.1 MHz, however, it is our view that this must be on a voluntary basis.

8. Accordingly, *It is ordered*, That pursuant to the authority contained in section 4(i) and 303 (c), (e), (g) and (r) of the Communications Act of 1934, as amended, the request of the United States Coast Guard that vessels be required to fit the frequency 157.1 MHz on a mandatory basis Is denied.

9. *It is further ordered*, That the proceeding in this Docket is terminated.

Adopted: June 10, 1975.

Released: June 18, 1975.

FEDERAL COMMUNICATIONS
COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretary.

[FR Doc.75-16524 Filed 6-24-75;8:45 am]

FEDERAL ENERGY ADMINISTRATION

[10 CFR Parts 303, 309]

ALLOCATION OF COAL

Notice of Proposed Rulemaking

Correction

In FR Doc. 75-15601 appearing on page 25228 in the issue of Friday, June 13, 1975, in the third column, seventh paragraph, the first line now reading, "'Proceeding' means the process and" should read "'Prohibitive order' means a directive"

FEDERAL POWER COMMISSION

[18 CFR Part 35]

[Docket No. RM75-29]

FPC RATE SCHEDULES

Proposed Fuel Adjustment Provisions

JUNE 17, 1975.

Notice is hereby given, pursuant to section 553 of Title 5 of the United States Code that the Commission is proposing to amend § 35.14 of its regulations under the Federal Power Act, in the manner set forth below. Generally stated, the changes would require, as a condition to the inclusion of a fuel adjustment clause in public utilities' FPC rate schedules, that the utility agree that all amounts collected under its fuel clause would be subject to refund. The utilities subject to the requirement of the proposed rule would also be required to file a semi-annual report with the

Commission containing detailed computations which clearly show the derivation of the fuel adjustment to be applied to each affected wholesale customer for each month of the six month period. The proposed revisions to the Regulations incorporate an existing fuel clause requirement and require the submission of all contracts related to fossil and nuclear fuel procurements, electric power purchase agreements not otherwise on file with the Commission, as well as additional data and information that this Commission considers necessary to evaluate the propriety of any proposed change under the fuel clause.

We recognize the need for a fuel adjustment clause. Properly administered fuel clauses can accomplish legitimate public interest objectives. Fuel clauses serve as a cost of service type mechanism to pass through changes in actual, reasonably and prudently incurred costs of fuel (decreases as well as increases), ensure appropriate and timely cash flow to electric utilities by eliminating "regulatory lag", and reduce regulatory expense, administrative processing costs and the number of formal rate proceedings. These features of the fuel clause inure to the benefit not only of the public utility but also the customer and taxpaying public. However, improperly administered or inadequately regulated by governmental authority, fuel clauses can be inequitable and unfair.

This Commission, therefore, must be vigilant in the exercise of its regulatory responsibilities to assure customers are charged no more than actual changes in fuel costs prudently incurred. At present, monitoring and investigative techniques being utilized by the Commission to meet that commitment include (1) compliance audits conducted by the Commission's audit staff as a part of its regular program of field audits of the books and records of public utilities subject to the Commission's jurisdiction, (2) review and investigation of fuel costs in conjunction with the Commission's analysis of specific proposed wholesale rate changes, (3) review of fuel adjustment clauses pursuant to Commission Order No. 517 which requires conformance with its directives by the end of 1975, (4) investigations of fuel costs under Section 206 of the Federal Power Act instituted either upon complaint or upon the Commission's own motion and (5) coordinated work with other federal regulatory agencies. Implementation of the proposed notice of rulemaking will supplement our present program of fuel cost surveillance and provide yet another means for assuring that electric consumers purchasing under the FPC regulated fuel clause are charged no more than actual changes in fuel costs reasonably and prudently incurred.

The measures we propose herein would provide the Commission with the opportunity to review rate changes resulting from operation of fuel clauses. Also, since the semi-annual filings permitted under the proposed regulations would not be in the nature of general rate increase applications, delays in final action on the filings would be kept to a minimum. As noted above, the type of fuel adjustments permitted under the revised regulation would not vary from those permitted under the existing regulations. The measures proposed herein only relate to the method by which these fuel adjustment rate increases may be verified and implemented. Initially, data would be required to be submitted which relates to the calculation of the base cost of fuel in the public utility's fuel clause in effect at the time of filing and for six month periods beginning with July, 1972. Subsequent reports will be submitted semi-annually for each month of the most recent six-month period.

The proposed rulemaking would further strengthen and tighten this Commission's present rate regulatory, accounting and public reporting procedures to assure that electric customers and consumers are fully protected from possible error, fraud, imprudence or maladministration of fuel clauses or fuel procurement practices. Three specific areas of inquiry relating to the determination of just and reasonable rates under fule adjustment clause provisions are of concern to the Commission, (1) fuel purchase practices, (2) fuel use patterns and (3) the method for determining the adjustment under the fuel adjustment clause. In order to fully explore each area of inquiry the Commission will require the submission of detailed factual data (some of which will lend itself to computerized statistical analysis), concise narrative explanations of company procurement policies and reports of actual procurement activity during the period covered by the proposed fuel adjustment. For example the proposed rulemaking will elicit valuable information about changes in the following areas of fuel purchase practices any of which may affect a utility's cost of fuel; quality and quantity of fuel, proportion of fuel purchased in spot market, terms of contracts, pricing policies of fuel delivered from captive or subsidiary operations, principal suppliers, and fuel transport methods. In addition to changes in fuel purchase practices, we recognize that the cost of fuel used to generate a given quantity of electricity may be affected by the fuel use pattern of the utility. Accordingly, the proposed rule would require reporting whereby this Commission could, *inter alia*, ascertain and evaluate the shifting of loads to plants using higher or lower cost fuel, the shifting of loads to more or less efficient plants, and plant conversions to higher priced "cleaner" fuel to meet State Implementation Plan requirements under the Clean Air Act or Federal Energy Administration directives under the Energy Supply and Environmental Coordination Act of 1974. With respect to (3) *supra*, additional information will be required to be submitted on the precise manner in which the fuel adjustment was calculated and determined.

To enable this Commission to adequately evaluate present procurement practices and policies we also find it necessary to secure certain historical information and data to ascertain trends and to assist us in understanding the significance of the current data to be supplied.

We also find it necessary in evaluating the fuel costs of a public utility to ascertain the fuel cost component associated with energy purchased from other public utilities which do not have fuel adjustment clauses. Such selling utilities would otherwise be exempt from the reporting requirements under Section 35.14 as proposed to be amended herein. To close this gap, we shall require the submission from all such public utilities the data and information required under Parts III and IV of proposed Form No. 71 by the addition of subparagraph (h) to § 35.14 of the Regulations under the Federal Power Act.

To facilitate the most effective and expeditious regulatory administration of the proposed program, we believe it necessary and in the public interest to establish a schedule for the filings to be made under the proposed regulations. For this purpose we find it reasonable and appropriate to require that the public utilities located within the regional electric reliability councils file in accordance with the schedule set forth in FPC Form No. 71 attached hereto.[1]

The proposed amendent to § 35.14 of the Commission's Regulations under the Federal Power Act would be issued under the authority granted the Federal Power Commission by the Federal Power Act, particularly sections 205, 206, 301, 304 and 309 (52 Stat. 822, 830, 76 Stat. 72; 15 USC 717c, 717o).

Any interested person may submit to the Federal Power Commission, 825 North Capitol Street, Washington, D.C. 20426, not later than August 1, 1975, data, views, comments, and suggestions, in writing, concerning the proposed amendments. An original and 14 conformed copies should be filed with the Commission. Submissions to the Commission should indicate the name, address and telephone numbers of the person to whom correspondence in regard to the proposal should be addressed. Responses to the submittals shall be filed no later than September 5, 1975, in the same form and number as the original submittals. All submittals and responses will be placed in the Commission's public files and will be available for inspection in the Commission's Office of Public Information, 825 North Capitol Street, Washington, D.C. 20426, during regular business hours.

All statements and submittals in response to this notice shall be under oath, acknowledged by a notary public or comparable official, as follows: ——— being duly sworn, deposes and says that he is (title and organization, if filing in a representative capacity) that he is authorized to verify and file this document, that he has examined the statements contained in the submittal or response, and that all such statements are true and correct to the best of his knowledge, information, and belief. The participants preparing statements and submittals, other than prepared data sheets in response to this rulemaking shall insert line numbers on each page in the left-hand margin.

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[1] Filed as part of the original document.

Accordingly, it is proposed to amend § 35.14 of the Commission's Regulations under the Federal Power Act, Chapter I, Title 18 of the Code of Federal Regulations as follows:

Section 35.14 of the Regulations under the Federal Power Act (Title 18, Part I, Subchapter B of the Code of Federal Regulations) is hereby amended, effective January 1, 1976, by adding the following paragraphs, (b) through (h):

§ 35.14 Fuel cost adjustment clauses.

* * * * *

(b) For each of the first six months beginning January 1, 1976, the monthly fuel adjustment computed in accordance with the principles provided for in paragraph (a) of this section shall be considered a tentative adjustment, subject to refund. The fuel adjustment shall not become final unless the Commission takes no affirmative action within 60 days after the filing of the semi-annual statement required by paragraph (c) of this section to initiate a proceeding to determine whether a refund should be ordered. The procedure will be followed in each succeeding six-month period.

(c) The public utility shall file with the Commission, the jurisdictional customers and interested state commissions the materials, documents and data as required pursuant to paragraphs (a)-(h) of this section and in accordance with the filing schedule set forth in PFC Form No. 71 attached hereto.[1]

(d) Submit copies of each fossil and nuclear fuel purchase contract, electric power purchase contracts not otherwise on file with the Commission and all other agreements, options or similar such documents, formal or otherwise, and all amendments and modifications thereof related to the procurement of fuel supply and purchased power. Incorporation by reference to prior submissions is permissible. However, any changes in the documents described herein, shall be submitted with the next semi-annual filing.

(e) With respect to documents submitted in accordance with paragraph (d) of this section which were executed on or after July 1, 1972, explain the circumstances under which the document was executed including whether competitive bidding was used, the extent to which the public utility sought alternate supplier(s) and any other offer(s) the public utility may have received from other suppliers. Submit such written documentation as may exist of the public utility's efforts to seek the lowest cost fuel supply with respect to each document executed.

(f) Submit a narrative description of the fuel procurement policy and practices of the public utility as it relates to each fuel consumed by the public utility. With respect to nuclear fuel procurement, the statement should describe the purchasing practice and policy with specific reference to the purchase of U_3O_8 (yellow cake) its conversion, enrichment, fabrication, storage and reprocessing.

(g) Submit the data and information required pursuant to FPC Form No. 71.[2]

(h) To determine the propriety of the fuel cost component of purchased energy all public utilities selling energy to public utilities with fuel adjustment clauses shall submit the data and information required under Part III and IV of FPC Form No. 71

The Secretary shall cause prompt publication of this notice to be made in the FEDERAL REGISTER.

By direction of the Commission.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16406 Filed 6-24-75;8:45 am]

INTERSTATE COMMERCE COMMISSION

[49 CFR Part 1056]

[Ex Parte No. MC-19 (Sub-No. 24)]

COLLECTION OF TOTAL FREIGHT CHARGES ON HOUSEHOLD GOODS SHIPMENTS SUBSTANTIALLY OR TOTALLY LOST OR DESTROYED

Carrier Restrictions

The Interstate Commerce Commission is proposing to amend Part 1056 of Title 49 of the Code of Federal Regulations by adding § 1056.26. This section would prohibit carriers from collecting total freight charges on household goods shipments either totally or substantially lost or destroyed. The effect of the proposed regulation would be the elimination of the widespread practice of household goods movers to collect the full transportation charges on shipments substantially lost or destroyed in transit; and to put into regulation form a position previously taken by the Commission on totally destroyed shipments.

This regulation is being proposed for the reasons set forth briefly below:

In Ex Parte No. MC-19 (Sub-No. 13), "Petition for Declaratory Order—Household Goods Freight Charges," 114 M.C.C. 176 (1971), the Commission concluded that where an interstate household goods shipment is totally destroyed and does not reach its destination, a carrier may not, subject to a limitation as to valuation charges, collect its lawfully published charges from the shipper inasmuch as the carrier's obligation to transport to the agreed destination has not been performed. As a result of this decision, the Commission has received inquires concerning the applicability of full freight charges where there is substantial (not total) loss or destruction of a household goods shipment.

The Commission decided to undertake a review of this matter by developing information from six household goods carriers. Data was obtained from each carrier covering the 12-month period of October 1, 1973 through September 30, 1974 and involving first proviso household goods shipments. This study indicated that five of the questioned carriers do have a policy to collect full transportation charges on household goods shipments substantially lost or destroyed.

In general, the carriers engaged in this practice state that their reasoning for not honoring a request for a refund of charges on partially delivered shipments is based on the theory that if any significant portion of a shipment is accepted by the consignee then he has realized the service performed and the carrier has earned the published tariff charges. More specifically, many carriers explain that goods are accepted with a released valuation of 60 cents per pound per article or else with a declared value protection either in a stated amount or an amount equal to $1.25 times the weight of the shipment in pounds. In either event, carriers explain that the giving and receiving of a consideration would be that which constituted a contract. Accordingly, they state that the transportation charges would constitute the receiving of consideration by a carrier, for which the carrier would contract to either deliver the said household goods to the prescribed destination and/or in the event that such delivery were impossible, the shipper would be compensated at the rate of 60 cents per pound per article or the amount of the declared value protection. In the carriers' view, if the shipper did not pay the transportation charges, then a contract would not exist and the carrier would have no liability.

A minority of carriers have indicated that it is their policy to collect freight charges for only that portion of the shipment delivered to the customer. However, certain of these carriers are of the view that they should be at least able to collect for the transportation of the goods to the point where the loss or destruction occurred.

The Commission is of the view that for reasons similar to those set forth in "Household Goods Freight Charges, supra" this practice of collecting total freight charges on household goods shipments substantially lost or destroyed is not in the public interest. The Commission is not in agreement with the carriers' argument that by paying the claim for the partially destroyed or lost portion of a shipment, it has made the shipper whole and therefore satisfied its responsibility to the shipper the same as though it had effected delivery of the entire shipment. Rather, it is the Commission's view that where a shipment is partially lost or destroyed, the consignee should not be required to pay freight charges on the entire shipment but only proportionate freight charges excluding those on the lost or totally destroyed portion. Accordingly under the proposed regulation, a carrier would deduct from the freight charges an amount proportionate to the weight of the lost or destroyed items.

In the same vein, we do not agree with the views of those carriers who attempt to collect for the transportation of the goods to the point where the loss or destruction occurs. Such transportation of the items for only part of the involved distance is of no value to the shipper. The proposed regulation would, however, allow a carrier to collect charges for accessorial or terminal services rendered in connection only with the preparation of that portion of the shipment not lost or destroyed in transit, as well as the appropriate valuation charges, and this should be sufficient protection for the carrier.

Oral hearings do not appear necessary at this time and none is contemplated. Anyone wishing to present views and evidence, either in support of, or in opposition to, the action proposed in this notice may do so by the submission of written data, views, or arguments. An original (and 15 copies whenever possible) of such data, views, or arguments shall be filed with:

Secretary, Interstate Commerce Commission
Washington, D.C. 20423

on or before August 4, 1975.

All written submissions will be available for public inspection during regular business hours at the offices of the Interstate Commerce Commission, 12th and Constitution Avenue, Washington, D.C.

This notice of proposed rulemaking is issued under the authority of Part II of the Interstate Commerce Act and sections 552, 553, and 559 of the Administrative Procedure Act (5 U.S.C. 552, 553, and 559).

Issued in Washington, D.C., June 5, 1975.

[SEAL] RICHARD W. KYLE,
Acting Secretary.

Accordingly, it is proposed to amend 49 CFR Part 1056 by adding § 1056.26 as follows:

§ 1056.26 Collection of total freight charges on household goods shipments substantially or totally lost or destroyed.

(a) No motor common carrier of household goods in interstate or foreign commerce shall collect, or require a shipper thereof to pay, the published freight charges, including charges for accessorial or terminal services, for services from origin to destination when the shipment of household goods is totally destroyed in transit; except that the carrier may collect, and the shipper will be required to pay, any specific valuation charge that may be due.

(b) In the event of loss or destruction of 10 percent or more, by weight, of a shipment of household goods while in transit but less than a total loss, no motor common carrier of household goods in interstate of foreign commerce shall collect, or require the shipper thereof to pay, the published freight charges for the percentage of the services from origin to destination corresponding to the portion of the shipment lost or destroyed; except that the carrier may collect, and the shipper will be required to pay, any charges for accessorial or terminal services rendered in connection with the preparation of that portion of the shipment not lost or destroyed and any specific valuation charge that may be due; and the carrier shall determine, at its own expense, the weight of the shipment which is not lost or destroyed.

(c) Affected carriers shall modify their tariffs in accordance with the provisions of paragraph (a) and (b) of this section on or before the effective date of this regulation.

At a general session of the Interstate Commerce Commission, held at its office in Washington, D.C., on the 5th day of June 1975.

Ex Parte No. MC-19 (Sub-No. 24)

COLLECTION OF TOTAL FREIGHT CHARGES ON HOUSEHOLD GOODS SHIPMENTS SUBSTANTIALLY OR TOTALLY LOST OR DESTROYED

It is ordered, That based on the reasons set forth in the attached notice, a proceeding be, and it is hereby, instituted pursuant to Part II of the Interstate Commerce Act and sections 552, 553, and 559 of the Administrative Procedure Act (5 U.S.C. 552, 553, and 559), for the purpose of amending 49 CFR Part 1056 by adding 49 CFR 1056.26.

It is further ordered, That the attached notice be, and it is hereby, adopted and is incorporated by reference into this order.

It is further ordered, That all motor common carriers of household goods be, and they are hereby, made respondents in the above-entitled proceeding.

And it is further ordered, That notice of the institution of this proceeding shall be given to the general public by depositing a copy of this order and the attached notice in the Office of the Secretary, Interstate Commerce Commission, Washington, D.C., for public inspection, and by delivering a copy of the notice to the Director, Office of the Federal Register as notice to interested persons.

By the Commission.

[SEAL] RICHARD W. KYLE,
Acting Secretary.

[FR Doc.75-16576 Filed 6-24-75;8:45 am]

notices

This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF STATE

[Public Notice CM-5/63]

STUDY GROUP 7 OF THE U.S. NATIONAL COMMITTEE FOR THE INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (CCIR)

Meeting

The Department of State announces that Study Group 7 of the U.S. National Committee for the International Radio Consultative Committee (CCIR) will meet on July 17, 1975 at the U.S. Naval Observatory, 34th Street and Massachusetts Avenue, NW., Washington, D.C. The meeting will be convened at 9:30 a.m. in Room 300 of Building No. 52.

Study Group 7 deals with time-signal services by means of radiocommunications. The purpose of the meeting will be a review of the work programs of U.S. Study Group 7 in preparation for the international meeting of Study Group 7 in February 1976.

Members of the general public may attend the meeting and join in the discussions subject to instructions of the Chairman. Admittance of public members will be limited to the seating available.

Dated: June 17, 1975.

GORDON L. HUFFCUTT,
Chairman,
U.S. National Committee.

[FR Doc.75-16489 Filed 6-24-75;8:45 am]

DEPARTMENT OF DEFENSE

Department of the Army

BALLISTIC MISSILE DEFENSE ADVANCED TECHNOLOGY CENTER

Closed Meeting

1. In accordance with section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-463), an announcement is made of the following committee meeting:

Name of Committee. Ballistic Missile Defense Technology Advisory Panel.

Dates of Meeting. July 22 through 24, 1975.

Place. BMD Advanced Technology Center, 106 Wynn Drive, Huntsville, Alabama 35807.

Time. 0800-1630 hours on dates indicated above.

Proposed Agenda.

I. A Detailed Review of the Technology Analysis Program.

II. The Systems Issues Associated with Optical Sensors.

III. The Statistical Analysis of Present Reentry Discrimination Schemes.

IV. Radar.

V. Dynamic Allocation in Data Processing.

VI. Space Technology Program.

2. The meeting is closed to the public since the agenda consists of BMDATC's on-going and future programs which are classified as SECRET or higher defense information pursuant to Executive Order 11652 (dated March 8, 1972); and therefore, do fall within the policies analogous to those recognized in section 552(b)(1) of Title 5, U.S. Code and national security does require that the details of these programs be withheld.

Dated: June 19, 1975.

WILLIAM A. DAVIS, Jr.,
Director.

[FR Doc.75-16482 Filed 6-24-75;8:45 am]

FEDERAL POWER COMMISSION

[Docket Nos. E-8885 and E-8546]

CINCINNATI GAS AND ELECTRIC CO.

Further Extension of Procedural Dates

JUNE 18, 1975.

On June 5, 1975, Staff Counsel filed a motion to extend the procedural dates fixed by order issued August 30, 1974, as most recently modified by notice issued May 12, 1975, in the above-designated matter, pending Commission action on the settlement agreement filed May 29, 1975.

Notice is hereby given that the procedural dates in the above matter are modified as follows:

Service of Staff Testimony, August 1, 1975.
Service of Intervenor Testimony, August 14, 1975.
Service of Company Rebuttal, August 28, 1975.
Hearing, September 9, 1975 (10:00 a.m., e.d.t.).

By direction of the Commission.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16458 Filed 6-24-75;8:45 am]

[Docket No. CP75-356]

CITIES SERVICE GAS CO.

Application

JUNE 18, 1975.

Take notice that on June 5, 1975, Cities Service Gas Company (Applicant), P.O. Box 25128, Oklahoma City, Oklahoma 73125, filed in Docket No. CP75-356 an application pursuant to section 7(c) of the Natural Gas Act for a certificate of public convenience and necessity authorizing the installation and operation of an additional town border metering station to deliver gas to The Gas Service Company (Gas Service) for resale and distribution in and around the town of Zarah, Kansas, all as more fully set forth in the application on file with the Commission and open to public inspection.

Applicant proposes to tap its existing 8-inch Bonner Springs pipeline in Johnson County, Kansas, and to install and operate measuring and regulating and appurtentant facilities for the purpose of selling and delivering natural gas to Gas Service. Applicant alleges that the total cost of construction would be $930 and that there will be no sales of additional gas. Applicant states that it currently delivers natural gas to the Gas Service at a border site to the south of Zarah, but that Zarah's growth has been to the northwest increasing the burden upon Gas Service's distribution facilities. Applicant further states that the proposed facilities would reduce the burden of the distribution service on Gas Service.

Any person desiring to be heard or to make any protest with reference to said application should on or before July 7, 1975, file with the Federal Power Commission, Washington, D.C. 20426, a petition to intervene or a protest in accordance with the requirements of the Commission's rules of practice and procedure (18 CFR 1.8 or 1.10) and the regulations under the Natural Gas Act (18 CFR 157.10). All protests filed with the Commission will be considered by it in determining the appropriate action to be taken but will not serve to make the protestants parties to the proceeding. Any person wishing to become a party to a proceeding or to participate as a party in any hearing therein must file a petition to intervene in accordance with the Commission's rules.

Take further notice that, pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Power Commission by sections 7 and 15 of the Natural Gas Act and the Commission's rules of practice and procedure, a hearing will be held without further notice before the Commission on this application if no petition to intervene is filed within the time required herein, if the Commission on its own review of the matter finds that a grant of the certificate is required by the public convenience and necessity. If a petition for leave to intervene is timely filed, or if the Commission on its own motion believes that a formal hearing is required, further notice of such hearing will be duly given.

Under the procedure herein provided for, unless otherwise advised, it will be unnecessary for Applicant to appear or be represented at the hearing.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16459 Filed 6-24-75;8:45 am]

[Project No. 796; Docket No. E-9305]

CITY OF PHOENIX, ARIZONA ET AL.

Order Consolidating Proceedings and Providing for Hearing

JUNE 17, 1975.

On February 3, 1975, the Salt River Pima-Maricopa Indian Community (Community) filed a petition to intervene and a request for a declaratory order that the transmission line Project No. 796 is a minor part of a project distribution system and therefore, is not within Commission jurisdiction. The relief that the Community requests is that an order be issued permitting intervention, declaring that the Commission is without jurisdiction, and cancelling the license.

In the alternative, the Community asserts a complaint alleging that the licensee, City of Phoenix, is in violation of the license since it conveyed the right-of-way and power transmission line to the predecessor in interest of the Salt River Project Agricultural Improvement and Power District without Commission approval. The Community states that the power capacity of the transmission line was increased without Commission approval. The Community further alleges that the transmission line was enlarged by adding a new leg without Commission approval. The Community requested that an order be issued to show cause why action should not be taken to cancel the license for Project No. 796.

On March 20, 1975, notice of the complaint was given. A petition to intervene was filed by the Salt River Project Agricultural Improvement and Power District (District) on April 28, 1975. A response opposing the petition was filed by the Community on May 14, 1975. The petition to intervene was granted on June 5, 1975.

On May 2, 1975, City of Phoenix (licensee) submitted a motion to file out of time its answer to the complaint. The licensee states that it believed at first that its rights would be fully protected by participation of the District in the proceeding. However, upon further examination, it was believed that the licensee's interests may not be property represented. Therefore, licensee determined that it should participate actively in the proceeding since it is the major user of the facilities. Licensee states that granting its motion would not delay the proceeding, but would facilitate the resolution of any questions presented. The Community filed a response to the Motion on May 12, 1975, stating that it had no objection to the out-of-time filing. We believe that the licensee has given good cause for the acceptance of their filing.

In licensee's answer, it denies the allegations in the complaint, except the paragraph concerning the location and licensing of the transmission line and the paragraph concerning the Community.

We believe that a hearing is necessary to resolve the issues raised in the complaint filed by the Community, primarily whether or not the transmission line is within our jurisdiction. There are several other issues that have been raised that the various parties will want to resolve including whether or not the license should be transferred from City of Phoenix to the District. We are also providing for a pre-hearing conference to determine if there are uncontroverted facts that can be presented without sponsoring witnesses.

As noted above, the Community has requested that an order be issued to show cause why action should not be taken to cancel the license for Project No. 796. We are denying the relief sought by the Community, since a controversy exists among the parties as to whether or not the project comes within Commission jurisdiction. Before this issue can be decided, a complete record must be developed. Therefore, we are ordering a hearing to determine whether or not the project is jurisdictional.

It is unnecessary to act on the intervention of the Community since it is a party to the proceedings by virtue of its complaint.

The Commission finds. (1) It is appropriate and in the public interest that the motion of the City of Phoenix to file out-of-time be granted.

(2) It is appropriate and in the public interest that a prehearing conference and hearing be held upon the complaint filed by the Salt River Pima-Maricopa Indian Community.

(3) It is appropriate and in the public interest that a hearing on the complaint (Docket No. E-9305) be consolidated to include the proceedings under Project No. 796.

(4) Those parties in Docket No. E-9305 and Project No. 796, the Salt River Pima-Maricopa Indian Community, Salt River Project Agricultural Improvement and Power District, and City of Phoenix shall be parties in the consolidated proceeding without further petition to intervene.

The Commission orders. (A) The Motion of the City of Phoenix to file out-of-time is hereby granted.

(B) The proceedings in Project No. 796 and Docket No. E-9305 are hereby consolidated.

(C) Pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Power Commission by the Federal Power Act, particularly sections 4(e), 8, 9, 306, 307, and 308 thereof and the Commission's rules of practice and procedure, a hearing shall be held in a hearing room of the Federal Power Commission, 825 North Capitol Street, NE Washington, D.C., respecting the matters involved and the issue presented in this proceeding.

(D) The following procedure is prescribed:

(1) The Presiding Administrative Law Judge shall hold a pre-hearing conference August 12, 1975, at 10 a.m. e.d.t., at which, among other matters, the admission into evidence of relevant but uncontroverted facts without the necessity of presenting a sponsoring witness therefore shall be considered.

(2) On September 22, 1975, all parties and Commission staff shall file an original and ten copies of direct testimony and accompanying exhibits. Each party shall serve copies on all parties.

(3) On October 14, 1975, all parties and Commission staff shall file an original and ten copies of rebuttal testimony and accompanying exhibits if desired. Each party shall serve copies on all parties.

(4) The hearing shall commence on October 28, 1975, at 10:00 a.m.

(5) For good cause shown the Presiding Administrative Law Judge may change the procedural dates set out above.

(E) All motions to strike prepared testimony, including exhibits, and replies to such motions shall be filed with the Presiding Administrative Law Judge within periods of time to be set by the Presiding Administrative Law Judge.

(F) All of the testimony, except exhibits, shall be in question and answer form.

(G) No exhibits, except those of which official notice may properly be taken, shall contain narrative material other than brief explanatory notes.

(H) Any party submitting more than one exhibit shall enclose a cover sheet listing the title of each exhibit and the sequence in which it is to be marked for identification.

(I) The Presiding Administrative Law Judge will specify the order of cross-examination.

(J) If upon motion filed 20 days in advance of the due date for submission of prepared direct testimony and a showing of fact upon which the Presiding Administrative Law Judge finds it would be an economic hardship to prepare written testimony, the Presiding Administrative Law Judge may permit a party to present sworn direct oral testimony.

(K) The Commission's rules of practice and procedure shall apply in this proceeding except to the extent they are modified or supplemented herein.

(L) For the purposes of this proceeding, the term "parties" shall apply to those delineated in finding (4) above.

(M) All procedural matters requested by the parties except those described above are hereby denied.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16460 Filed 6-24-75;8:45 am]

[Docket Nos. CP75-323; CP75-300]

COLORADO INTERSTATE GAS CO.

Postponement of Hearing

JUNE 17, 1975.

On June 13, 1975, Colorado Interstate Gas Company filed a motion to postpone the hearing date fixed by order issued May 1, 1975, as most recently modified by notice issued May 22, 1975, in the above-designated matter.

Upon consideration, notice is hereby given that the hearing date in the above matter is postponed until July 15, 1975, at 10 a.m., e.d.t.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16461 Filed 6-24-75;8:45 am]

[Docket No. CP75-359]

COLUMBIA GULF TRANSMISSION CO.

Application

JUNE 18, 1975.

Take notice that on June 5, 1975, Columbia Gulf Transmission Company (Applicant), P.O. Box 683, Houston, Texas 77001, filed in Docket No. CP75-359 an application pursuant to section 7(c) of the Natural Gas Act for a certificate authorizing the construction and operation of 16.2 miles of 16-inch pipeline from a producing platform in Block 595, West Cameron Area, offshore Louisiana, to a proposed 24-inch pipeline in Block 601, West Cameron Area, offshore Louisiana, all as more fully set forth in the application on file with the Commission and open to public inspection.

Applicant proposes to construct and operate a 16.2 mile pipeline from Block 595 to Block 601 and to install and operate or have operated approximately 1,100 compressor h.p. Applicant states that Columbia Gas Transmission Corporation (Columbia Transmission) has obtained from Clark Oil Producing Co., Home Petroleum Corporation, H. W. Bass & Sons, Inc. and American Independent Oil Company the purchase rights to the gas produced in the north third of Block 595 and that three exploratory wells have been drilled in the acreage. Applicant estimates, based on these drillings, that the proven gas reserves under contract to Columbia Transmission to be approximately 50 million Mcf and could be as high as 100 million Mcf. Applicant states that a 21 well slot platform would be installed by mid-1975 and that an estimated initial gas production of at least 30,000 Mcf per day would commence in the second quarter of 1976.

Applicant states that the proposed facilities are estimated to cost $9,453,148, to be financed from current working funds.

Applicant alleges that there are no other pipelines in the area that could furnish the pipeline capacity that is necessary to transport the estimated volumes of gas. The proposed pipeline would connect to the 24-inch and 30-inch pipeline, for which a request for certificate authorization is pending in Docket No. CP75-262, proposed to be constructed by Applicant and Tennessee Gas Pipeline Company, a Division of Tenneco Inc.

Any person desiring to be heard or to make any protest with reference to said application should on or before July 8, 1975, file with the Federal Power Commission, Washington, D.C. 20426, a petition to intervene or a protest in accordance with the requirements of the Commission's rules of practice and procedure (18 CFR 1.8 or 1.10) and the regulations under the Natural Gas Act (18 CFR 157.10). All protests filed with the Commission will be considered by it in determining the appropriate action to be taken but will not serve to make the protestants parties to the proceeding. Any person wishing to become a party to a proceeding or to participate as a party in any hearing therein must file a petition to intervene in accordance with the Commission's rules.

Take further notice that, pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Power Commission by sections 7 and 15 of the Natural Gas Act and the Commission's rules of practice and procedure, a hearing will be held without further notice before the Commission on this application if no petition to intervene is filed within the time required herein, if the Commission on its own review of the matter finds that a grant of the certificate is required by the public convenience and necessity. If a petition for leave to intervene is timely filed, or if the Commission on its own motion believes that a formal hearing is required, further notice of such hearing will be duly given.

Under the procedure herein provided for, unless otherwise advised, it will be unnecessary for Applicant to appear or be represented at the hearing.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16462 Filed 6-24-75;8:45 am]

[Docket No. E-9481]

DUKE POWER CO.

Filing of Supplement to Contract

JUNE 18, 1975.

Take notice that on June 9, 1975, Duke Power Company (Duke) tendered for filing a supplement to the Electric Power Contract between Duke and the City of Greenwood (City). The contract is Duke rate schedule FPC No. 250. The supplements provide for an increase in contract demand at three delivery points. Duke states that the increases are made at the request and with the agreement of the City. The proposed effective date is July 21, 1975.

Any person desiring to be heard or to protest said filing should file a petition to intevene or protest with the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before July 10, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16463 Filed 6-24-75;8:45 am]

[Docket No. E-9453]

DUKE POWER CO.

Order Accepting Proposed Rate Increase for Filing, Suspending Use Thereof, Providing for Hearing and Establishing Procedures

JUNE 18, 1975.

On May 21, 1975, Duke Power Company (Duke) tendered for filing proposed changes in its tariff[1] which would increase revenues from jurisdictional sales and services by approximately $24 million based on the twelve-month period ending December 31, 1975. Duke proposes an effective date of June 30, 1975.

In support of its filing Duke states that during the twelve-month period ending December 31, 1974, the company earned a rate of return on its wholesale business of 5.2 per cent, a figure which it claims does not permit the attraction of capital needed to provide reliable service to its customers. Duke also states that no facilities will be installed or modified to effect the proposed changes.

Notice of this filing was issued on May 29, 1975, with comments, protests, or petitions to intervene due on or before June 12, 1975. No such responses have yet been received.

Our review of the changes in rates filed herein indicates that the proposed rates have not been shown to be just and reasonable. We shall, therefore, accept Duke's tendered tariff changes for filing and suspend the use thereof until July 1, 1975, when they will be permitted to become effective, subject to refund. We shall also provide for an evidentiary hearing to test the lawfulness of the proposed rates.

The Commission finds. It is necessary and proper in the public interest and in carrying out the provisions of the Federal Power Act that the Commission enter upon a hearing concerning the lawfulness of the rates and other terms and provisions of service proposed herein by Duke Power Company, and that such rates, terms, and provisions be suspended and the use thereof referred as hereinafter ordered.

The Commission orders. (A) Pursuant to the authority of the Federal Power Act, particularly sections 205, 206, 308, and 309 thereof, and the Commission's rules and regulations, a public hearing shall be held commencing on November 11, 1975, in a hearing room of the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, concerning the lawfulness of the rates, charges, classifications and services contained in Duke Power's FPC Electric Tariff, as proposed to be amended herein.

(B) Pending hearing and decision thereon, Duke Power's proposed tariff sheets are hereby suspended and the use thereof deferred until July 1, 1975.

(C) On or before August 26, 1975, the Commission Staff shall serve its prepared testimony and exhibits. The prepared testimony and exhibits of any intervenors shall be served on or before September 23, 1975. Any rebuttal evidence by Duke Power shall be served on or before October 21, 1975.

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[1] Duke Power Company's FPC Electric Service Tariff Volume Nos. I–VI; See designations at Appendix A.

(D) A Presiding Administrative Law Judge to be designated by the Chief Administrative Law Judge for that purpose (See delegation of authority, 18 CFR 3.5(d)) shall preside at the hearing initiated by this order and shall conduct such hearing in accordance with the Federal Power Act, the Commission's rules and regulations, and the terms of this order.

(E) The Secretary shall cause prompt publication of this order in the FEDERAL REGISTER.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

APPENDIX A

Duke Power Co., rate schedule designations—filed May 21, 1975, dated undated, effective

Supplement No.	Supersedes supplement No.	Rate schedule FPC No.	Customers
24	17	131	Blue Ridge EMC, N.C.
27	19	134	Davidson EMC.
13	11	136	Haywood EMC.
15	14	137	Pee Dee EMC.
17	14	138	Piedmont EMC.
42	34	139	Rutherford EMC.
30	19	140	Surry-Yadkin EMC.
21	15	141	Union EMC.
50	37	142	Blue Ridge EC, S.C.
33	28	143	Broad River EC.
83	56	144	Laurens EC.
27	21	145	Little River EC.
47	29	146	York EC.
9	8	155	Town of Bostic.
8	7	163	Town of Due West.
6	5	218	City of Newberry.
9	8	225	City of Albemarle.
12	11	226	City of Greer.
31	26	227	City of Gastonia.
20	15	228	City of Rock Hill.
8	7	229	Town of Lincolnton.
9	7	230	Town of Landis.
12	10	231	City of Abbeville.
9	7	232	Town of Cornelius.
10	7	233	Town of Davidson.
9	7	234	Town of Pineville.
15	13	235	City of Shelby.
9	7	236	Heath Springs Light & Power Co.
11	9	237	Town of Forest City.
10	9	238	City of Monroe.
10	8	240	City of Statesville.
24	13	241	City of Easley.
11	10	242	Town of Prosperity.
11	9	243	City of Gaffney.
15	14	244	City of Laurens (delivery point Nos. 1 and 2).
9	8	245	City of Concord.
8	6	246	Town of Maiden.
42	29	248	Crescent EMC.
6	5	249	City of Clinton.
18	17	250	City of Greenwood.
6	4	251	Town of Huntersville.
8	5	252	Lockhart Power Co.
7	4	253	University of North Carolina.
6	4	254	Town of Dallas.
8	5	255	Town of Granite Falls.
5	4	256	Town of Westminster.
7	6	257	Town of Drexel.
7	6	258	City of Cherryville.
5	4	259	Clemson University.
7	4	260	City of Kings Mountain.
9	8	261	City of Morganton.
6	5	262	South Carolina Electric & Gas Co.
3	2	263	City of Seneca.
6	4	264	City of High Point.
3	2	266	City of Newton.
4	1	267	City of Lexington.

[FR Doc.75-16461 Filed 6-24-75;8:45 am]

[Docket No. E-9482]

DUKE POWER CO.

Filing of Supplement to Contract

JUNE 18, 1975.

Take notice that on June 9, 1975, Duke Power Company (Duke) tendered for filing a supplement to the Electric Power Contract between Duke and the Town of Cornelius (Town). The contract is Duke rate schedule FPC No. 232. Duke states that the supplement provides for a change in delivery voltage made at the request of and with the agreement of the Town. The proposed effective date is July 21, 1975.

Any person desiring to be heard or to protest said filing should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before July 10, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16464 Filed 6-24-75;8:45 am]

[Docket No. CI75-335]

EDWIN M. JONES OIL CO.

Withdrawal and Cancellation of Hearing

JUNE 17, 1975.

On June 12, 1975, Edwin M. Jones Oil Company filed a withdrawal of its application for permission to abandon a sale of gas, filed November 21, 1974, in the above-designated matter which was set for hearing by order issued June 9, 1975.

Notice is hereby given that pursuant to § 1.11(d) of the Commission's rules and regulations the withdrawal of the above application shall become effective July 14, 1975. The hearing scheduled for July 9, 1975 is cancelled.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16467 Filed 6-24-75;8:45 am]

[Docket Nos. E-8170, E-9091]

GEORGIA POWER CO.

Tariff Changes

JUNE 18, 1975.

Take notice that Georgia Power Company (Georgia Power), on June 12, 1975, tendered for filing Revised Sheets Nos. 3-B, 3-D, 3-F, 3-G, 3-H, 3-I, 3-J, 3-K, and 3-L to its FPC Electric Tariff, Volume No. 1. Georgia Power states that these revisions cover routine changes in said tariff, effective in the first and second quarters of 1975, consisting of six (6) new wholesale delivery points and seven (7) conversions of existing wholesale delivery points to the WR-7/WR-8 rates.

Georgia Power states that the above changes reflect the fact that Georgia Power has established six (6) new delivery points for existing customers, where service will be rendered at the WR-7/WR-8 rates currently on file with the Commission and that pursuant to the terms of the present tariff, seven (7) delivery points have been converted to the WR-7/WR-8 rates. Included in the filing are thirteen (13) supplemental sheets giving data on the delivery points involved in the above changes, according to the Company.

Georgia Power states that copies of this filing have been served upon "all-affected customers."

Any person desiring to be heard or to protest said application should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before July 3, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this application are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16465 Filed 6-24-75;8:45 am]

[Docket No. E-9489]

GULF STATES UTILITIES CO.

Filing of Supplement to Rate Schedule

JUNE 18, 1975.

Take notice that on June 11, 1975 Gulf States Utilities Company (Company) tendered for filing notice of the establishment of a temporary metering point pursuant to a supplementary agreement between the Company and Sam Rayburn Dam Electric Cooperative, Inc., which is served under Company rate schedule FPC No. 98 and the City of Liberty, Texas, which is served under Company rate schedule FPC No. 96. The Company states the metering point will serve 50 KVA of oil field pumping. The temporary point was established April 29, 1975 and is expected to last approximately eighteen months.

Any person desiring to be heard or to protest said filing should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before July 10, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16466 Filed 6-24-75;8:45 am]

[Docket No. E-9023]

INTERSTATE POWER CO.

Order Approving Settlement Agreement Subject to Condition

JUNE 17, 1975.

On September 19, 1974, Interstate Power Company (Interstate) tendered for filing proposed changes in its rate tariff sheets for its firm customers, thirteen municipalities in Illinois, Iowa and Minnesota.[1] The proposed filing would have increased annual jurisdictional revenues by $193,986, based upon calendar year 1973 as a test year.

By Commission Order issued October 18, 1974, the proposed increase was suspended for one day until October 21, 1974, when it became effective, subject to refund, and procedural dates for hearing were established. In the October 18, 1974, order, the Commission further ordered Interstate to file a revised fuel adjustment clause within 30 days which would conform to FPC Opinion No. 633 and which would be effective October 21, 1974. During the interim, the proposed fuel clause would be suspended and, upon filing the revised fuel clause, Interstate's refund obligation with respect thereto would terminate as the Company made interim refunds as required.

On November 18, 1974, the Company filed a motion for extension of time to file its response to the requirement for a revised fuel clause. The Secretary issued a notice on November 21, 1974, extending the filing date to December 4, 1974. On December 2, 1974, Interstate requested waiver of the requirement to file a revised fuel clause. The request to lift the suspension on the fuel clause currently in effect was denied by an order dated December 31, 1974, wherein the Commission observed that the fuel cost benefit to the customers claimed by Interstate had no assurance of continuing. The order also provided that such denial did not prejudice Company's right to file a substitute fuel clause in conformance with Order No. 517.

On February 5, 1975, the Secretary issued notice of a conference held February 14, 1975, during which Interstate and Staff agreed to a settlement. On March 19, 1975, Interstate filed the proposed stipulation and settlement which was noticed by the Secretary on March 26, 1975, with petitions or protests due on or before April 25, 1975. Staff filed comments in support of the proposed settlement on April 25, 1975. There were no other comments, petitions or protests.

The proposed settlement reflects an increase in annual revenues of $172,795, a reduction of $21,191 from the originally proposed $193,986 in additional revenues in the Company's September 19, 1974, filing.[2] The settlement rates would yield an overall rate of return of 7.87 percent which would yield a return on common equity of 13.08 percent.[3] The revised fuel clause filed by the Company under this accord is in conformance with Commission order no. 517. Moreover, the data supplied with the settlement indicate that for the first three months the interim filed fuel clause was in effect, the revenues collected under it were less than the revenues which would be generated under the settlement fuel clause, so that there will be no refunds with respect to it.

Interstate will refund, with 7 percent interest, to its firm wholesale customers all amounts collected subject to refund from October 21, 1974, exceeding the settlement revenue level.

Further, the settlement rate contains a provision permitting an adjustment to billing for any taxes based on those sales of electricity, levied upon those sales or measured by those sales. As such an adjustment would result in a change in rates, any implementation of said tax adjustment clause will necessitate a section 205 rate filing, and we shall condition our acceptance to so provide.

Our review of the proposed settlement, Staff's comments and the related record indicates that it is a reasonable and appropriate resolution of the issues in this proceeding in the public interest and that, accordingly, it should be adopted as hereinafter ordered and conditioned.

The Commission finds. The proposed settlement of this proceeding as filed by Interstate with the Commission on March 19, 1975, is reasonable and proper and in the public interest in carrying out the provisions of the Federal Power Act and should be approved, as hereinafter ordered and conditioned.

The Commission orders. (A) The proposed settlement filed by Interstate on March 19, 1975, is incorporated herein by reference and made a part hereof and is approved and adopted to be effective as of October 21, 1974, as hereinafter ordered and conditioned.

(B) Within 30 days from the date of this order, Interstate shall file with the Commission revised rate schedules conforming to those attached as Exhibit B to the proposed settlement agreement.

(C) Any proposed rate change to be made under the tax adjustment clause shall be effected by means of a section 205 rate filing made at least 30 days prior to the proposed effective date of the proposed rate change.

(D) Interstate shall file with the Commission a report of the payment of all refunds, including the 7 percent interest per annum thereon.

(E) The proceeding in the above-captioned docket shall be terminated upon the receipt by the Commission of the report pursuant to ordering paragraph "D", above.

(F) This order is without prejudice to any findings or orders which have been made or which may hereafter be made by the Commission, and is without prejudice to any claims or contentions which may be made by the Commission, its staff, Interstate, or by any other party or person affected by this order in any proceeding now pending or hereinafter instituted by or against Interstate or any other person or party.

(G) The Secretary shall cause prompt publication of this order to be made in the FEDERAL REGISTER.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

ATTACHMENT A

Interstate Power Co., docket E-9023, exhibit A, to stipulation and settlement agreement, cost of service

Item	Company's original filing	Company's proposed settlement
1973 revenue:		
As billed	$1,068,697	$1,068,697
As adjusted	1,087,787	1,087,787
Increase rate level—as originally proposed	1,281,773	
Settlement rate level		1,260,582
Operating expense:		
Operation and maintenance	583,444	579,699
Depreciation expense	122,593	133,656
Taxes other than income	88,922	105,080
Other expenses and revenue credits—net		(7,340)
Income taxes	164,767	145,252
Total operating expenses	959,726	956,347
Operating income	322,047	304,235
Rate base	3,813,970	3,865,759
Revenue increase	193,986	172,795

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[1] These customers include Albany and Hanover located in Illinois; Alta Vista, Fairbank, Fredericksburg, Grafton, Guttenberg, Lawler, Readlyn and Sabula located in Iowa; Dundee, Rushford and St. Charles located in Minnesota.

[2] The settlement cost of service is attached as Attachment A to this order.

[3] See Attachment B.

ATTACHMENT B

INTERSTATE POWER CO., SPECIAL EXHIBIT

Interstate Power Co.—*Capitalization as of June 30, 1974, adjusted to reflect real and anticipated changes through Dec. 31, 1974*

Class of capital	Amount (in thousands)	Capital ratios (percent)	Cost or allowance (percent)	Weighted return (percent)
Long-term debt	$130,809	58.84	5.76	3.39
Preferred stock	28,300	12.73	6.00	0.76
Common equity [1]	63,202	28.43	13.08	3.72
Total	222,311	100.00		
Return on total capital				7.87

[1] This includes additional retained earnings from July 1, 1974, through Dec. 31, 1974.

[FR Doc.75-16399 Filed 6-24-75;8:45 am]

[Docket No. E-9181]

NANTAHALA POWER AND LIGHT CO.

Further Extension of Procedural Dates

JUNE 18, 1975.

On June 17, 1975, Staff Counsel filed a motion to extend the procedural dates fixed by order issued February 14, 1975, as most recently modified by notice issued May 7, 1975, in the above-designated matter. The motion states that the parties have been notified and have no objection.

Upon consideration, notice is hereby given that the procedural dates in the above matter are modified as follows:

Service of Staff and Intervenor Testimony, July 16, 1975.
Service of Company Rebuttal, July 23, 1975.
Hearing (Unchanged), August 5, 1975 (10 a.m., e.d.t.).

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16468 Filed 6-24-75;8:45 am]

[Docket Nos. E-9136; E-9140]

NEW ENGLAND POWER CO.

Order Compelling Production of Data and Extending Procedural Dates

JUNE 18, 1975.

Commission staff has filed two motions in the above-captioned proceedings. The first, filed May 23, 1975, requests an extension of the presently-established procedural dates, beginning with the June 10, 1975, date for service of staff's testimony. Staff seeks a delay of approximately 60 days in these proceedings, and for good cause states that said delay is necessary in order to allow staff sufficient time to receive and review certain data to be submitted by the New England Power Company (NEPCO) in response to staff's data requests of March 26 and May 22, 1975, the most recent of which followed NEPCO's May 16, 1975, submission of revised Period II data which, according to staff, differs in both numerical calculations and methodology from its original filing.

Staff's second motion, filed June 9, 1975, requests that we issue an order directing NEPCO to fully and promptly comply with the aforementioned data requests. Staff suggests that we establish June 13, 1975, as the date for such compliance.

Staff's May 23, 1975, motion to extend procedural dates is opposed by the Rhode Island Division of Public Utilities and Carriers, Rhode Island Consumers Council, and the Attorney General of the State of Rhode Island (Respondents), whose joint response was filed June 3, 1975. Respondents state in substance that they oppose NEPCO's alleged practice of continually filing new testimony and exhibits in an effort to postpone indefinitely the resolution of its pending rate cases. Respondent assert that further prolongation of these proceedings will unreasonably complicate the refund process in the event the Commission ultimately determines the proposed rates to be excessive. Respondents would therefore have us deny Staff's motion, find that NEPCO's May 16, 1975, filing cannot be timely considered in these proceedings, and order NEPCO and staff to proceed on the basis of previously filed testimony.

Staff's June 9, 1975, motion to compel production of data was answered by NEPCO on June 12, 1975. NEPCO alleges that its May 16, 1975, cost of service exhibits reflect late-April updates to its operating estimate for 1975, the effects of which nullify the usefulness of the answers that NEPCO might have given to staff's March 16, 1975, data request. Referring to staff's May 22, 1975, data request, however, NEPCO states its willingness and intention to respond to all items, save the last one, by June 13, 1975, and to mail its response to the final item by June 30, 1975.[1] NEPCO submits that issuance of the requested motion to compel production is therefore unnecessary.

Upon consideration, we find that both of staff's motions should be granted, although, in light of the postponed procedural dates, we will give NEPCO until June 30, 1975, to complete its answer to staff's March 26 and May 22, 1975, data requests, including item No. Power-21. NEPCO will not be permitted to supplement its R-9 rate increase after that date. While we appreciate and share Respondents' awareness that the public interest demands that proposed rate increases be made in good faith and disposed of as speedily as possible,[2] we find that the requested extension of time is reasonable and proper under present circumstances.

The Commission finds. Good cause has been shown to grant staff's motion of May 23, 1975, requesting an extension of procedural dates in this proceeding, and staff's motion of June 9, 1975, requesting the Commission to compel production of certain specified data from NEPCO.

The Commission orders. (A) The procedural dates in Docket Nos. E-9136 and E-9140 are hereby modified as follows:

Service of staff's testimony, August 12, 1975.
Service of Intervenors testimony, August 26, 1975.
Service of Company rebuttal, September 9, 1975.
Hearing, September 23, 1975.

(B) On or before June 30, 1975, NEPCO shall file responsive evidence which complies as fully as possible with Staff's March 26, and May 22, 1975, data requests in these consolidated proceedings, including but not limited to item No. Power-21 of the May 22, 1975, request.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16469 Filed 6-24-75;8:45 am]

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[1] The final item contained in Staff's May 22, 1975, data request is labelled "Power 21", and solicits NEPCO's response to items numbered 2 through 10 in the original data request of March 26, 1975, to be updated, where appropriate, to reflect NEPCO's revised filing of May 22, 1975.

[2] See section 205(e) of the Federal Power Act.

[Docket No. E-8928]

PACIFIC GAS & ELECTRIC CO.

Further Extension of Procedural Dates

JUNE 17, 1975.

On June 10, 1975, Pacific Gas and Electric Company filed a motion to extend the procedural dates fixed by order issued August 22, 1974, as most recently modified by notice issued May 15, 1975, in the above-designated matter. The motion states that the parties have been notified and have no objection.

Upon consideration, notice is hereby given that the procedural dates in the above matter are modified as follows:

Service of Company Rebuttal, July 7, 1975.
Hearing, July 22, 1975 (10 a.m., e.d.t.).

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16476 Filed 6-24-75;8:45 am]

[Docket No. E-9383]

PUBLIC SERVICE COMPANY OF COLORADO

Initial Rate Schedule

JUNE 17, 1975.

On April 14, 1975, Public Service Company of Colorado (PSC), tendered for filing an initial agreement with the City of Burlington, Colorado, which provides for the sale of firm power to Burlington via facilities owned by Tri-State G&T Association, Inc. The proposed rates and charges for such firm power service to Burlington are the same as those on file with this Commission for service to its other municipal wholesale customers, and which are under suspension at Docket No. E-8882. The company requests that its proposed rates be placed into effect as of May 15, 1975.

Notice of the filing was issued on April 23, 1975, with comments, protests, or petitions to intervene due on or before May 8, 1975. No comments, protests, or petitions to intervene have been filed.

By certified letter dated May 5, 1975, the Secretary informed PSC that its filing was deficient in that the proposed fuel adjustment clause contained within its filing did not comply with § 35.14 of the regulations as amended by Order No. 517.[1]

By letter dated May 14, 1975, and received by this Commission on May 21, 1975, PSC responded to the Commission stating that it is their position that the fuel clause in question did not have to comply with the Commission's regulations as amended by Order No. 517 in that the fuel clause is not a new or revised fuel adjustment clause within the contemplation of such regulations. The company states that the rate and fuel clause are its established rate and fuel clause currently on file for service to its other small wholesale customers.

PSC in the alternative contends that even if the current regulations require a compliance filing, such requirement should be waived since Burlington needs the power which the company has undertaken to supply.

The company also stated that it would serve no useful purpose to require it to immediately prepare a compliance filing solely with respect to Burlington since the company must, of necessity, make a filing to bring the fuel clauses applicable to all of its wholesale service, including Burlington into conformity with the substantive provisions of § 35.14 of our regulations. PSC alleges that requiring an immediate compliance filing would result in an undesirable situation, both administratively and equitably, in that the rates and charges to similarly situated small wholesale customers would be different during the interim period due to being computed on the basis of different fuel adjustment clauses.

Finding Paragraph (4) of Order No. 517 specifically states that the amended regulation shall be effective for all initial rates filed on or after January 1, 1975. Ordering Paragraph (A) of Order No. 517 effects this result. Accordingly, although the fuel clause is identical to the fuel clause on file with other rate schedules, it must comply with the amended regulation.

As to PSC's arguments in support of waiver of the requirements of our regulations, we find that the company has not demonstrated good cause for such waiver. The fact that the company must make a compliance filing with regard to its other rate schedules within seven months is not adequate reason to absolve it of its responsibility to meet the current requirements of the regulations as they apply to this rate schedule. The fact that similar customers will be receiving service pursuant to differing rate schedules is not discriminatory *per se*. Indeed, PSC does not argue discrimination, alleging only an "undesirable situation".

With respect to the assertions contained in PSC's letter of May 14, 1975, to this Commission, specifically the first paragraph of page three thereof, we find it necessary to note that rejection of the instant submittal shall not constitute grounds for PSC's refusal to make service available to the City of Burlington under the terms and conditions of a Commission approved rate schedule.

The Commission finds. Good cause exists to reject PSC's tendered filing of April 14, 1975, for failure to comply with the regulations of this Commission.

The Commission orders. (A) PSC's tendered filing, received April 14, 1975, is hereby rejected for failure to comply with applicable Commission regulations.

(B) This rejection is without prejudice to PSC's tender of a filing for service to the City of Burlington which complies with this Commission's fuel clause regulations.

(C) The Secretary shall cause prompt publication of this order in the FEDERAL REGISTER.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16470 Filed 6-24-75;8:45 am]

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[1] Docket No. R-479, issued November 13, 1974.

[Docket No. RI75-145]

SKELLY OIL CO.

Hearing on and Suspension of Proposed Change in Rate

JUNE 16, 1975.

Respondent has filed a proposed change in rate and charge for the jurisdictional sale of natural gas, as set forth in Appendix A hereof.

The proposed changed rate and charge may be unjust, unreasonable, unduly discriminatory, or preferential, or otherwise unlawful.

The Commission finds. It is in the public interest and consistent with the Natural Gas Act that the Commission enter upon a hearing regarding the lawfulness of the proposed change, and that the supplement herein be suspended and its use be deferred as ordered below.

The Commission orders. (A) Under the Natural Gas Act, particularly sections 4 and 15, the regulations pertaining thereto (18 CFR Ch. I), and the Commission's rules of practice and procedure, a public hearing shall be held concerning the lawfulness of the proposed change.

(B) Pending hearing and decision thereon, the rate supplement herein is suspended and its use deferred until date shown in the "Date Suspended Until" column. This supplement shall become effective, subject to refund, as of the expiration of the suspension period without any further action by the Respondent or by the Commission. Respondent shall comply with the refunding procedure required by the Natural Gas Act and § 154.102 of the regulations thereunder.

(C) Unless otherwise ordered by the Commission, neither the suspended supplement, nor the rate schedule sought to be altered, shall be changed until disposition of this proceeding or expiration of the suspension period, whichever is earlier.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

APPENDIX A

Docket No.	Respondent	Rate schedule No.	Supplement No.	Purchaser and producing area	Amount of annual increase	Date filing tendered	Effective date unless suspended	Date suspended until—	Cents per Mcf* [1]		Rate in effect subject to refund in docket No.
									Rate in effect	Proposed increased rate	
RI75-145..	Skelly Oil Co..............	257	7	Natural Gas Pipeline Co. of America.	$1,102	5-21-75	....	11-21-75	36.9	37.3	

*Unless otherwise stated, the pressure base is 14.65 lb/in²a.

[1] Unless otherwise stated, the rate shown is the total rate, inclusive of any applicable British thermal unit adjustment and tax.

The proposed rate increase by Skelly exceeds the applicable area ceiling in Opinion No. 662 and is suspended for five months.

[FR Doc.75-16400 Filed 6-24-75;8:45 am]

[Docket No. E-8823]

SOUTH CAROLINA ELECTRIC AND GAS CO.

Cancellation of Hearing

JUNE 18, 1975.

Take notice that on June 17, 1975, an order was issued in the above designated matter approving a settlement agreement. Upon receipt by the Commission of the report regarding refunds and interest this proceeding will be terminated. Notice is hereby given that the hearing scheduled for September 2, 1975, by notice issued June 2, 1975, is cancelled.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16471 Filed 6-24-75;8:45 am]

[Docket No. E-8823]

SOUTH CAROLINA ELECTRIC AND GAS CO.

Order Approving Settlement Agreement

JUNE 17, 1975.

On May 31, 1974, South Carolina Electric and Gas Company (SCE&G) tendered for filing in the above captioned docket revised tariff sheets under its FPC Electric Tariff[1] for service to its resale customers. The Tariff then on file with the Commission contained two separate rates: SR-1, applicable for resale service to public power bodies and REA Cooperatives for demands under 2,000 kW and SR-2 applicable for demands over 2,000 kW. The rate schedule WR originally proposed in Docket No. E-8823 would have replaced SR-1 and SR-2 and increased revenues by $1,871,242 (22.7 percent) for the twelve months following the proposed effective date of July 1, 1974.

Notice of the proposed increase was issued on June 11, 1974, with comments, protests or petitions to intervene due on or before June 19, 1974. Petitions to intervene were received from the City of Orangeburg, South Carolina (Orangeburg) and jointly from the Berkeley Electric Cooperative, the Palmetto Electric Cooperative and the Saluda River Electric Cooperative (Co-ops).

By order issued August 2, 1974, the Commission, *inter alia*, suspended the proposed rate changes for one day permitting them to become effective August 4, 1974, subject to refund, set the matter for hearing, and granted the above named petitioners intervention.

Staff filed its cost of service testimony and exhibits on November 22, 1974. Staff's study indicated that SCE&G was entitled to an increase of $1,690,134 or 92.2 percent of the $1,833,143 requested by SCE&G based on Period II, calendar year 1974 data.

On March 5, 1975, SCE&G tendered for filing a proposed Settlement Agreement. The proposed settlement is the result of discussions held between SCE&G and the intervenors, Orangeburg and Co-ops. The proposed settlement is concurred in by all of the above-named intervenors in this proceeding. The proposed settlement was noticed on March 21, 1975, with comments, protests and petitions to intervene due on or before April 22, 1975. On April 22, 1975, Staff filed comments indicating its support of the agreement.

The proposed settlement provides for (1) the reduction of the demand charge for the first 200 kW of billing demand from $830 to $630; (2) the reduction of the energy charge from 1.095¢ per kWh to 1.046¢ per kWh; and (3) the design of the fuel clause to conform to the requirements of § 35.14 of the regulations, as amended by Order No. 517. Exhibit B attached to the Settlement Agreement recomputed the revenues based upon the aforementioned change in rates for the test period 1974.[2]

The proposed settlement will reduce the amount of the originally proposed increase in the May 31, 1974, filing from $1,833,143 to $1,664,040, which is less than the $1,690,134 that Staff's cost of service study found justified, based on 1974 test period data.

The proposed rates, as compared with Staff's filed cost of service as shown on Appendix B, would yield an 8.62 percent overall rate of return and a 12.31 percent rate of return on common equity.[3]

Based upon our review of the proposed settlement agreement, we find that the settlement agreement represents a reasonable resolution of the issues in this proceeding in the public interest, and that accordingly it should be approved and adopted.

The Commission finds. The settlement of this proceeding on the basis of the settlement agreement tendered for filing by SCE&G on March 5, 1975, is reasonable and proper and in the public interest in carrying out the provisions of the Federal Power Act; and such agreement should be approved.

The Commission orders. (A) The proposed settlement agreement filed on March 5, 1975, by SCE&G is incorporated herein by reference and hereby approved and adopted.

(B) Within thirty days from the date of this order, SCE&G shall file with the Commission revised tariff sheets in conformity with the terms of the settlement agreement herein approved and the Commission's regulations under the Federal Power Act. Such tariff sheets shall be effective as of August 4, 1974.

(C) The fuel clause in the proposed settlement agreement is permitted to become effective August 4, 1974, concurrently with the rates approved in the settlement agreement.

(D) Within thirty days of the filing of the revised sheets, SCE&G shall refund to its customers the difference between the amounts collected since August 4, 1974, under the rates currently in effect and the amount which would have been collected under the proposed settlement rates, with interest at 7 percent per annum.

(E) SCE&G shall file with the Commission concurrently with the refunds ordered in Paragraph (D), a report of such refunds and interest.

(F) The proceedings in Docket No. E-8823 will be terminated upon receipt and approval of such report.

(G) This order is without prejudice to any findings or orders which have been or will be made by the Commission and is without prejudice to any claims or contentions which may be made by the Commission, its Staff, SCE&G, or any party or person affected by this order, in any proceeding now pending or hereinafter instituted by or against SCE&G or any other person or party.

(H) The Secretary shall cause prompt publication of this order in the FEDERAL REGISTER.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

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[1] Designated as Second Revised Sheet Nos. 5 and 6 under FPC Electric Tariff Original Volume No. 1.

[2] See Appendix A.

[3] See Appendix C.

APPENDIX A

SOUTH CAROLINA ELECTRIC & GAS CO., MUNICIPALS & COOPERATIVES REVENUE FOR 1974, PROJECTED TEST YEAR

12 mo ended Dec. 31, 1974, forecast

	Revenue at rate prior to increase (1)	Demand (2)	Energy (3)	Fuel (4)	Total (5)	Difference (col. 5—col. 1) (6)	Percent increase col. 5÷col. 1 (7)
Municipals:							
McCormick	$187,031	$95,754	$135,562	$(213)	$231,103	$44,072	23.564
Orangeburg	4,831,661	[1] 2,135,502	3,756,186	2,130	5,893,818	1,062,157	21.983
Winnsboro	540,952	266,191	297,135	1,157	664,483	123,531	22.836
Total	5,559,644	2,497,447	4,288,883	3,074	6,789,404	1,229,760	22.119
Cooperatives:							
Berkeley, Jedburg	69,733	[1] 33,858	50,200	423	84,489	14,756	21.161
Berkeley, Johns Island	723,332	[1] 351,687	543,397	(387)	894,697	171,365	23.691
Berkeley, McClellanville	90,198	46,223	65,542	(168)	111,597	21,399	23.724
Berkeley, Mount Pleasant	114,756	60,663	83,052	249	143,964	29,208	25.452
Broad River	109,098	53,100	79,308	(267)	132,141	23,043	21.121
Central	13,996	8,181	10,063	128	18,372	4,376	31.266
Little River	147,919	[1] 79,104	107,424	(242)	186,286	38,367	25.938
Palmetto	24,579	14,704	17,751	57	32,512	7,933	32.276
S.C.P.S.A., Woodland Hills	359,674	[1] 222,849	260,716	(58)	483,507	123,833	34.429
Total	1,653,285	870,360	1,217,461	(265)	2,087,565	434,280	26.268
Grand total	7,212,929	3,367,816	5,506,344	2,809	8,876,969	1,664,040	23.070

[1] Discount of $0.15/kW of demand.

Note.—Demand charge is $3.15/kW. Billed kilowatt is (1) equal to the maximum integrated 15 min. demand measured during the current month; (2) 70 percent of the highest demand occurring during the 11 preceding months; (3) the contract demand; or (4) 200 kW. If the customer's power factor falls below 85 percent, the power factor shall be adjusted to 85 percent. All kilowatt-hours shall be billed at 0.01946.

APPENDIX B

SOUTH CAROLINA ELECTRIC AND GAS COMPANY

Sales for Resale, Test Year 1974

Settlement revenues	$8,876,969
Staff filed cost of service:	
Operating expenses before taxes	6,274,297
Return at 8.68 percent	1,945,519
Income taxes	683,244
Revenue requirements	8,903,062
Excess revenues	(26,093)
Return on excess revenues	(12,716)
Total return earned	1,932,803
Rate base	22,413,805
Rate of return earned (percent)	8.62

APPENDIX C

SOUTH CAROLINA ELECTRIC AND GAS CO.

Proforma capitalization per staff filing at Dec. 31, 1974 (in thousands of dollars) using settlement realized rate of return and resultant cost of equity

	Capitalization		Annual cost (percent)	Weighted cost (percent)
	Amount	Rates (percent)		
Long-term debt	$389,130	53.09	6.98	3.71
Preferred stock [1]	101,201	13.81	7.18	.99
Common equity [2]	233,398	31.84	12.31	3.92
Deferred income taxes (A/C 281)	9,259	1.26		
Total	732,988	100.00		
Recommended rate of return				8.62

[1] Includes Company's January 1974 preferred stock issue of $15 million.

[2] Includes Company's proposed common stock issue in later months of 1974 (approximate proceeds of $26,337,000).

[FR Doc.75-16401 Filed 6-24-75;8:45 am]

[Docket No. E-9486]

SOUTHERN CALIFORNIA EDISON CO.

Initial Rate Schedule

JUNE 18, 1975.

Take notice that on January 9, 1975 the Southern California Edison Company (Edison) tendered for filing an initial rate schedule in the form of a contract with Pacific Gas and Electric Company (PG&E) which is designated as follows:

PG&E—Edison Kern Magunden, Transmission Service Contract, Dated April 29, 1975.

Edison states that the contract provides for the transmission by PG&E of up to 165 megawatts of electrical capacity and energy over Edison's 220 KV line between points at which PG&E's transmission system shall become connected thereto. The agreed-upon rate for this service is stated to be $8,000 per month.

Edison further states that inasmuch as the transmission service was urgently needed by May 1, 1975, and was in fact provided on and from that date, it is requesting a waiver of the notice requirements of the Commission's regulations to allow an effective date of May 1, 1975.

Edison states that copies of this filing have been mailed to PG&E and to the PUC of California.

Any person desiring to be heard or to protest said filing should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before June 25, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16472 Filed 6-24-75;8:45 am]

[Docket No. E-9484]

SOUTHERN SERVICES, INC.

Filing of Amendment to Interchange Agreement

JUNE 17, 1975.

Take notice that on June 9, 1975, Southern Services, Inc. (Southern) tendered for filing on behalf of itself, Alabama Power Company, Georgia Power Company, Gulf Power Company and Mississippi Power Company, a letter agreement dated May 1, 1975, amending Section 3 of Service Schedule A of the Interchange Contract with Duke Power Company dated June 1, 1961. The amendment is limited to the basis of settlement for emergency service between the parties.

Southern requests an effective date of July 2, 1975.

Any person desiring to be heard or to protest said application should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure. All such petitions or protests should be filed on or before June 24, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this application are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16473 Filed 6-24-75;8:45 am]

[Docket No. E-8746]

STATE OF VERMONT PUBLIC SERVICE BOARD AND POWER AUTHORITY OF THE STATE OF NEW YORK

Extension of Time

JUNE 16, 1975.

On June 12, 1975, the Power Authority of the State of New York filed a motion to extend the date for filing briefs on exceptions to the initial decision of the Presiding Administrative Law Judge issued May 15, 1975 in the above-designated matter. The motion states that the parties have been notified and have no objection.

Upon consideration, notice is hereby given that the date for filing briefs on exceptions in the above matter is extended to and including June 30, 1975, and the date for filing briefs opposing exceptions is extended to and including July 21, 1975.

MARY B. KIDD,
Acting Secretary.

[FR Doc.75-16474 Filed 6-24-75;8:45 am]

[Docket No. RP71-130, RP72-58, RP74-39-11]

TEXAS EASTERN TRANSMISSION CORP. ET AL.

Order Approving Settlement Agreement and Terminating Proceeding

JUNE 18, 1975.

On October 21, 1974, the Borough of Chambersburgh, Pennsylvania (Chambersburg) filed in Docket No. RP74-39-11 a supplemental petition for a declaratory order pursuant to § 1.7(c) of the Commission's rules of practice and procedure. Chambersburg requested that the Commission issue an order directing Texas Eastern Transmission Corporation (TETCO): (1) To cease and desist from its present method of implementing its demand charge adjustment (DCA) provisions and (2) to implement its DCA provisions in a manner which would lower Chambersburg's demand charges by reflecting the difference between Chambersburg's requirements and its actual takes.

Chambersburg purchases all of its gas from TETCO under the latter's DCQ-D Rate Schedule and WS Rate Schedule.

TETCO placed its DCA provisions into effect on July 2, 1974. They apply to all customers purchasing gas under a two-part rate schedule. Sections 6.2 and 7.2 of TETCO's FPC Gas Tariff, Fourth Revised Volume No. 1 provide for demand charge adjustments for DCQ and GS customers respectively. The two sections, which are identical, read as follows:

> 6.2, 7.2 *For Impairment of Deliveries.* If Seller, for any reason other than the allowable delivery variation and the provisions of § 12.5 of the General Terms and Conditions, is unable to deliver during any one or more days in any month the quantity of natural gas Buyer required on such day or days up to the Maximum Daily Quantity then the total demand charge as otherwise computed hereunder shall be reduced by an amount which shall be equal to the sum of all such day's deficiencies multiplied by the Demand Charge Adjustment (Sheet No. 13) per Mcf for the applicable zone.

TETCO recoups the revenues lost through the demand charge adjustment by increasing its total commodity charges by an amount equal to the total of the reductions in demand charges. Both of these adjustments are made on a separate basis for each rate schedule and zone on TETCO's system.

In its supplemental petition Chambersburg claimed that the method which TETCO uses to calculate demand charge adjustments is unjust and discriminatory. Chambersburg stated that TETCO is violating the spirit of our order issued in this proceeding on August 26, 1974, in which we stated that the DCA provisions should ameliorate the situation in which a customer being curtailed at a rate higher than the system average also pays higher unit rates.

Public notice of Chambersburg's supplemental petition was issued on November 6, 1974.

Under its present method of implementation, TETCO makes a demand charge adjustment only on those days that a customer takes 96 percent or more of its curtailed MDQ on the theory that if a customer takes this much gas then the customer needs its full MDQ. The demand charge adjustment is always calculated on the total Mcf difference between MDQ and curtailed MDQ. No attempt is made to determine the customer's actual requirements above its curtailed MDQ although TETCO's tariff states that a demand charge reduction is granted when Texas Eastern is unable "to deliver during any one or more days in any month the quantity of natural gas buyer requires on such day or days up to the Maximum Daily Quantity." Consequently on any day in which a customer takes less than 96 percent of its curtailed MDQ, it receives no demand charge reduction because TETCO holds that the requirements of that customer had, on that day, been met.

Chambersburg stated that since its Annual Quantity Entitlement (AQE) is based on a historical load factor of 88 percent it cannot purchase 96 percent of its curtailed MDQ on every day without overrunning its AQE and incurring a penalty.[1] Consequently, Chambersburg argued that the demand charge adjustment should be calculated in a manner which recognizes the requirements of a customer during the base period in order that Chambersburg, with one of the highest curtailment levels on the system, might receive a larger demand charge adjustment which could actually reflect Chambersburg's high curtailment.

Chambersburg suggested that a more equitable method for calculating the demand charge adjustment would be to use the dth difference between (a) a customer's actual present takes and (b) its requirements during the pro forma base year[2] used to establish AQE's.

On January 17, 1975, we issued an order consolidating Docket No. RP74-39-11 with Docket Nos. RP71-130 and RP72-58, the TETCO curtailment proceedings, for the purposes of hearing and decision. We required TETCO to submit, on or before February 18, 1975, evidence comparing the impact on its customers of (1) its present method of implementation and (2) the method proposed by Chambersburg. Finally, we required Presiding Administrative Law Judge Morse to render an Interim Initial Decision within 45 days of the conclusion of cross examination.

TETCO filed its testimony on February 18, 1975; no answering evidence was tendered.

A hearing on the issues raised by Chambersburg was begun on March 17, 1975. Shortly after the first witness (appearing for TETCO) took the stand, counsel for Chambersburg suggested that a settlement discussion might be appropriate to resolve the controversy.

A Stipulation and Agreement, drafted by the parties of interest as a proposed settlement, was submitted to the Presiding Judge on March 21, 1975. On March 26, 1975, the Presiding Judge certified that document to the Commission. Notice of the certification was issued on March 27, 1975.

The Stipulation and Agreement is a six page document consisting of an introduction and five articles.

Article I provides that within ten days after the date upon which the Commission's order approving the settlement becomes final, TETCO will file revised tariff sheets which will implement its DCA provisons by calculating DCA credits using the difference between (a) a customers actual present takes and (b) its requirements during the pro forma base year used to establish AQEs. The new sheets would be made effective as of July 2, 1974. Article I provides, in addition that TETCO shall have no additional refund liability because of calculating DCA credits in the agreed manner.

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[1] Of the 25 customers purchasing under the DCQ rate schedule, 21 have AQE's which are virtually 100 percent of their contract entitlements. Indiana Gas Company's AQE is 84 percent of its contract entitlement, National Gas and Oil Corporation, 95 percent, Chambersburg, 88 percent, and Pottsville Gas Company, 99 percent.

[2] The AQE's of the DCQ customers were fixed by taking the actual purchased volumes for the period September, 1970 through November, 1971, and estimated purchased volumes for December, 1971 through August, 1972, and then constructing the annual entitlement for a *pro forma* year on the basis of the highest monthly volume for each corresponding month.

Article II provides that within ten days after Article I becomes effective TETCO will refund charges collected since July 2, 1974, which would not have been collected under the proposed DCA implementation. These refunds will include interest at a rate of 7 percent per annum from the date of receipt of payment until the refunds are mailed. An amount equal to the one-time refunds described above shall be included in the DCA Commodity Surcharge Account.

Article III provides that this settlement will only become effective if the Commission's order becomes final and unappealable, and provided that the Commission waives its General Rules and Regulations to permit the settlement to take effect.

Article IV provides that the settlement shall be effective as of July 2, 1974.

Article V provides that if the settlement is not approved, it shall be privileged and of no effect, and further, that no party waives any rights not expressly provided for in the Stipulation and Agreement.

We believe that the Settlement by the parties embodied in the Stipulation and Agreement is just and reasonable resolution of the issues raised in Docket No. RP74-39-11. The terms of the settlement are, we believe, consistent with § 6.2 of TETCO's tariff.

As Staff points out, under the settlement Chambersburg's annual cost for service will decrease by 13 percent while no customer will sustain an increased cost of even one percent.

No parties to these proceedings oppose the substance of the settlement, although several parties suggested conditions which they believe we should impose if we approve it.[3]

The Public Service Commission of the State of New York (New York) and Philadelphia Gas Works (PGW) suggest that DCA credits for Chambersburg and other similarly situated DCQ customers be reduced whenever such customer within the month exercised its right to take gas in excess of its curtailed MDQ.[4] New York suggests that DCA credits be reduced by a percentage equal to the number of days in the month a customer exceeds its curtailed MDQ divided by the total number of days in the month, without regard to the degree to which the curtailed MDQ was exceeded on any given day. PGW suggests that monthly DCA credits be reduced by the number of dekatherms the customer takes on any given day in excess of its curtailed MDQ.

We are pursuaded by the arguments of Chambersburg and Staff that Chambersburg and other similarly situated customers should not be penalized by the adoption of the suggestions made by New York and PGW. First, it is apparent that Chambersburg will receive reduced DCA credits on any day during which it has exceeded its curtailed MDQ, for on those days the difference between its requirements and its actual takes will be reduced. New York and PGW would impose, in effect, a double penalty upon small customers taking advantage of the exemption from daily curtailment to which they are entitled.

Second, under the New York proposal, no weight is given to the volumes by which Chambersburg would exceed its curtailed MDQ. Chambersburg's DCA credits will be reduced by a fraction equal to 1 (no. of days in month) for each day it takes volumes above its curtailed MDQ. In theory, if Chambersburg exceeds its curtailed MDQ by only 1 Mcf on each day of the month, it will receive no DCA credits for the month. We see no justice in such a result.

Third, New York suggests in its argument that Chambersburg and other similarly situated customers are free to serve low priority end uses on days in which they exceed their curtailed MDQs. Inasmuch as Chambersburg must live within the same annual curtailment as the large TETCO customers, it is not free to squander its peak day purchases on low priority loads, because such a course would leave Chambersburg without sufficient volumes to serve high priority loads during other times of the year. For each day Chambersburg exceeds it curtailed MDQ it must take less than its curtailed MDQ on another day or on other days in order to live within its annual curtailment. As we stated in our orders of November 2, 1973 and August 30, 1974, issued in Docket Nos. RP71-130, et al., and our order of August 26, 1974 in Docket No. RP74-39-11, TETCO's exemption of small customers from daily curtailment is necessary to permit the small customers to serve high priority loads on peak days.

New York and PGW imply that under the proposed settlement Chambersburg will be receiving some benefits not available to the large customers which are not exempt from daily curtailment. We should point out that when AQEs were adopted by TETCO in September 1972, Chambersburg and other small customers who historically purchased at less than a 100 percent load factor gave up a portion of their annual contract entitlements. Large customers which purchase at a 100 percent load factor gave up no portion of their annual contract entitlements. In return for giving up a part of their annual contract entitlements, the small customers were "rewarded" with an exemption from daily curtailment, necessary to protect their high priority loads. We cannot see how the proposed settlement, which curtails all DCQ customers in an identical manner, benefits Chambersburg, or prejudices New York and PGW in such a way as to warrant adoption of the New York and PGW proposals.

The Commission finds. (1) The proposed settlement, certified to the Commission by the Presiding Judge, is a just and reasonable resolution to the controverted issues raised by Chambersburg in Docket No. RP74-34-11, and should be approved.

(2) Waiver of our Regulations to the extent necessary to permit the settlement to become effective is in the public interest.

(3) The issues raised in Docket No. RP74-39-1, having been resolved by our approval of the proposed settlement, Docket No. RP74-39-11 should be terminated.

The Commission orders. (A) The proposed settlement in Docket Nos. RP71-130, et al., is hereby approved.

(B) The Commission, pursuant to § 1.7 (b) of our rules of practice and procedure waives its regulations, including, but not limited to Part 154 thereof, to the extent necessary to effectuate all of the provisions of the Stipulation and Agreement certified to us on March 26, 1975, by the Presiding Judge.

(C) Docket No. RP74-39-11 is hereby terminated.

By the Commission.

[SEAL] MARY B. KIDD,
Acting Secretary.

[FR Doc.75-16475 Filed 6-24-75;8:45 am]

[Docket No. E-7929]

TOLEDO EDISON CO.

Order Conditionally Approving Settlement

JUNE 17, 1975.

On December 22, 1972, Toledo Edison Company ("Toledo Edison") filed proposed standard rate schedules to be effective March 1, 1973, replacing existing individual small municipal wholesale customers' contracts upon their expiration, and filed proposed large municipal wholesale rate schedules which were to become applicable to all such customers on March 1, 1973, except for Bryan, Ohio, whose contract expired May 31, 1974. The proposed rate schedules would have raised Toledo Edison's annual revenues by $494,747, based on 1971 data. By order issued February 28, 1973, the Commission accepted for filing the small municipal rates effective March 1, 1973, and suspended the large municipal rates until August 1, 1973. Toledo Edison filed revised fuel adjustment clauses on April 30, 1973, for both large and small municipal service. The direct evidence of Toledo Edison, Staff and two intervenors was marked for identification at a prehearing conference held on October 30, 1973. On September 4, 1974, the Presiding Administrative Law Judge certified to the Commission a proposed settlement agreement submitted by Toledo Edison and Bryan and Bowling Green, Ohio. A motion was filed by Toledo Edison, Bryan and Bowling Green on September 9, 1974, requesting acceptance of the settlement proposal and requesting waiver of the provisions of § 35.13 of the regulations under the Power Act requiring supporting data.

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[3] Brooklyn Union Gas Company states that it opposes the settlement unless we impose conditions which would eliminate DCA credits for any customer overrunning its AQE. We believe that the AQE overrun problem which is currently being examined in proceedings held in Docket Nos. RP75-, *et al.*, is not relevant to the substance of the instant settlement.

[4] Chambersburg and other customers of TETCO who have a total MDQ contractual entitlement of 10,200dths or less per integrated system, and which do not obtain natural gas from any other pipeline suppliers in the same service area, are permitted to take up to their full MDQ on any given day.

The settlement proposal incorporates new tariff sheets reducing the requested increase in the large municipal resale rate annual revenues to approximately $140,000. The monthly billing demand ratchet would be reduced to 60 percent from the originally proposed 75 percent, and other adjustments would be made in the exceptions to the monthly billing demand calculation for emergency outages and maintenance. As such, the settlement proposal would result in an increase in jurisdictional revenues $108,505 greater than that produced in Staff's cost of service study, Schedule 2, Exhibit S–5 for identification, using a 7.75 percent overall rate of return and an 11.73 percent return on equity. Under the settlement agreement, Toledo Edison would be subject to a jurisdictional rate increase moritorium until September 1, 1975.

Staff has filed the only comments against the settlement. Staff objects to the inclusion of the portion of the proposed $140,000 increase in annual revenues to cover spinning reserve capacity costs and to the fuel adjustment clause provisions contained in the proposed tariff.

We find merit in Staff's objections, and, therefore we will accept the proposed settlement subject to revision of the proposed tariff eliminating the objectionable elements.

The putative spinning reserve costs should be eliminated from the general rate for two reasons. First, it appears that only Bryan and Napoleon, Ohio, would be beneficiaries of the spinning reserve capacity in question. Thus, it would be unfair to the other non-benefitting municipals to permit such costs to be rolled into the cost of service supporting the generally applicable rate increase.

Our second objection to the purported spinning reserve costs is that certain elements of the two reserve cost calculations presented by Toledo Edison are questionable. Appendix B to the settlement agreement contains a calculation of the cost of the monthly average reserve available to Bryan and Napoleon totalling $68,567. The calculation and the allocation of the cost between the two municipals are suspect. The calculation is based on the cost of five peaking turbines for which no support has been presented. The allocation of the purported reserve costs to Bryan utilizes the criterion of Bryan's maximum generation capability with its largest generating unit out of service. No justification for the use of this criterion is apparent. In addition, the same criterion is inconsistently not used to allocate costs to Napoleon. Without explanation, the reserve cost allocation to Napoleon also differs from that for Bryan in that 90 percent of Napoleon's 1972 transformer capacity is used as a limiting factor rather than Napoleon's total energy requirements.

A second calculation of spinning reserve costs is presented in an attachment to the joint request to respond to Staff's comments filed by Toledo Edison, Bryan and Bowling Green on November 19, 1974. This second calculation produces a total reserve cost of $70,630. Although similar assumptions are used for both Bryan and Napoleon, two new assumptions are employed: a spinning reserve provided by Toledo Edison to the two municipals equal to 6.5 percent of their generation capacity and an assumed cost of $27.72 per KW per year. There is no explanation for the derivation of the 6.5 percent or the $27.72 figures.

Based on the foregoing, we find the purported spinning reserve costs to be inadequately justified and inappropriate to be included in the generally applicable municipal rates. In the event, however, that Bryan and Napoleon agree to separately pay the purported costs under a special rate schedule, we would accept appropriately revised tariff sheets excluding the purported $70,630 of annual spinning reserve capacity costs from the large municipal resale rates.

The fuel adjustment clauses contained in the proposed tariff sheets were not in conformity with the provisions of § 35.14 of the regulations under the Power Act when originally filed. Paragraphs (4) of the Toledo Edison's FPC Electric Tariff Second Revised Sheet No. 6 and First Revised Sheet No. 12 fail to reflect changes in the fuel cost per kilowatt hour of delivered energy cost for energy received by Toledo Edison under firm purchase contracts entered into after April 30, 1973. In addition, the base cost of fuel is not stated in cents per million B.t.u. It is therefore necessary to require revision of the fuel adjustment clauses. But, since the clauses also are not in the form required by the presently effective provisions of § 35.14 which require all non-conforming clauses to be revised on or before January 1, 1976, it is appropriate to permit a choice between revising the clauses to conform to the former or present provisions of § 35.14. Unless conformed to the present provisions of § 35.14, however, the revised clauses will, nevertheless, have to be appropriately amended by January 1, 1976.

The record does not disclose whether Toledo Edison has, in fact, entered into any firm energy purchase contracts on or after April 30, 1973, upon which base fuel cost adjustments have been predicated. In order to review the appropriateness of any such adjustment, Toledo Edison shall be required to treat the implementation of any such adjustment as a rate change.

The Commission finds. The settlement of this proceeding on the basis of the settlement proposal certified to the Commission on September 4, 1974, appropriately modified as conditioned below, is reasonable and proper and in the public interest in carrying out the provisions of the Federal Power Act, and such agreement should be approved as hereinafter ordered.

The Commission orders. (A) The settlement certified to the Commission on September 4, 1974, is approved, and the large municipal resale service tariff, appropriately revised as provided hereinafter, is assigned an effective date of August 1, 1973, provided, however, that the following conditions are satisfied:

(1) The proposed large municipal resale service tariff rates shall be revised to exclude costs of $70,636 for providing spinning reserves for the benefit of Bryan and Napoleon; and

(2) Bryan and Napoleon shall agree that they alone will pay the total cost of spinning reserve service; and

(3) Toledo Edison shall revise its large municipal resale service tariff to set forth a separate spinning reserve service rate schedule permitting recovery of the costs excluded by paragraph (A)(1), above; and

(4) The fuel adjustment clauses contained in paragraphs (4) of Toledo Edison's FPC Electric Tariff Second Revised Sheet No. 6 and First Revised Sheet No. 12 shall be revised to conform to either the presently effective provisions of § 35.14 or those in effect on April 30, 1973; provided, however, that the foregoing shall not relieve Toledo Edison of the obligation imposed by the presently effective provisions of § 35.14(a)(8); and

(5) Toledo Edison shall file in the form of a rate change any adjustment in the base fuel cost resulting from firm energy purchase contracts entered into after April 30, 1973.

(B) The effective dates of appropriately revised small and large municipal resale service tariff fuel adjustment clauses shall be, respectively, March 1, 1973, and August 1, 1973.

(C) Toledo Edison shall file with the Secretary of the Commission within 15 days from the date of issuance of this order a statement indicating whether it will comply with the foregoing acceptance conditions.

(D) In the event that Toledo Edison makes an affirmative response to paragraph (C), above, Toledo Edison shall file with the Commission revised tariff sheets in conformity with the terms of the settlement agreement herein conditionally approved within 45 days from the date of this order.

(E) Within 30 days of the filing of the revised tariff sheets pursuant to paragraph (D), above, Toledo Edison shall refund to its customers the difference between the amounts collected under the rates currently in effect from their effective date and the amount which would have been collected under the proposed settlement rates as conditionally accepted herein, with interest at 7 percent per annum.

(F) Toledo Edison shall file with the Commission, concurrently with the refunds ordered in Paragraph (E), above, a schedule of such refunds.

(G) This order is without prejudice to any findings or orders which have been or will be made by the Commission and is without prejudice to any claims or contentions which may be made by the Commission, its Staff, Toledo Edison, or any party or person affected by this order in any proceeding now pending or hereinafter instituted by or against Toledo Edison or any other person or party.

(H) The Secretary shall cause prompt publication of this order in the FEDERAL REGISTER.

By the Commission.

[SEAL] KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16402 Filed 6-24-75;8:45 am]

[Docket No. E-9496]

UNION ELECTRIC CO.

Tariff and Rate Schedule Changes

JUNE 18, 1975.

Take notice that Union Electric Company (Union) on June 13, 1975 tendered for filing proposed changes in its FPC Electric Service Tariffs Nos. W-2, 47 and 49. Union states that the proposed changes would increase revenues from jurisdictional sales and service by $15,953,000 based on the twelve-month period ending May 31, 1976. Union also states that the proposed filings also modify its existing fuel cost adjustment clauses in the above tariffs to conform to Section 35.14 of the Commission's regulations.

Union Electric's proposed increase in rates is due to the increased costs of construction, capital, wages, property and payroll taxes and other similar increases in costs, and the Company contends that the rate increases are necessary in order to provide a fair return to the Company and its investors and at the same time generate sufficient cash to insure the Company's ability to continue to provide service.

Copies of the filing were served upon the public utility's jurisdictional customers and the Missouri Public Service Commission and Iowa State Commerce Commission.

Any person desiring to be heard or to protest said application should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street, NE, Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protest should be filed on or before July 2, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this application are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16477 Filed 6-24-75;8:45 am]

[Docket No. G-7193, etc.]

UNION OIL CO. OF CALIFORNIA ET AL.

Applications for Certificates, Abandonment of Service and Petitions To Amend Certificates[1]

JUNE 17, 1975.

Take notice that each of the Applicants listed herein has filed an application or petition pursuant to section 7 of the Natural Gas Act for authorization to sell natural gas in interstate commerce or to abandon service as described herein, all as more fully described in the respective applications and amendments which are on file with the Commission and open to public inspection.

Any person desiring to be heard or to make any protest with reference to said applications should on or before July 11, 1975, file with the Federal Power Commission, Washington, D.C. 20426, petitions to intervene or protests in accordance with the requirements of the Commission's rules of practice and procedure (18 CFR 1.8 or 1.10). All protests filed with the Commission will be considered by it in determining the appropriate action to be taken but will not serve to make the protestants parties to the proceeding. Persons wishing to become parties to a proceeding or to participate as a party in any hearing therein must file petitions to intervene in accordance with the Commission's rules.

Take further notice that, pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Power Commission by sections 7 and 15 of the Natural Gas Act and the Commission's rules of practice and procedure a hearing will be held without further notice before the Commission on all applications in which no petition to intervene is filed within the time required herein if the Commission on its own review of the matter believes that a grant of the certificates or the authorization for the proposed abandonment is required by the public convenience and necessity. Where a petition for leave to intervene is timely filed, or where the Commission on its own motion believes that a formal hearing is required, further notice of such hearing will be duly given.

Under the procedure herein provided for, unless otherwise advised, it will be unnecessary for Applicants to appear or be represented at the hearing.

KENNETH F. PLUMB,
Secretary.

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[1] This notice does not provide for consolidation for hearing of the several matters covered herein.

Docket No. and date filed	Applicant	Purchaser and location	Price per Mcf	Pressure base
G-7193 D 5-27-75	Union Oil Co. of California, P.O. Box 7600, Los Angeles, Calif. 90051.	Mobil Oil Corp., West Gueydan Field, Vermillion Parish, La.	Depleted	....
G-7490 C 5-30-75	Amoco Production Co., P.O. Box 3092, Houston, Tex. 77001.	Northern Natural Gas Co., Drinkard Field, Lea County, N. Mex.	[1] 58.3383	14.65
G-7970 C 1-20-75	Amoco Production Co. (Operator) et al., Security Life Bldg., Denver, Colo. 80202.	do	[2] 51.6	14.73
CI61-187 D 6-2-75	Mobil Oil Corp., 3 Greenway Plaza East, Suite 800, Houston, Tex. 77046.	Natural Gas Pipeline Co. of America, Camrick Field, Texas and Beaver Counties, Okla.	Uneconomical	....
CI61-908 (CS71-995) CF 5-5-75	Mobil Oil Corp. (Operator) et al.	Arkansas Louisiana Gas Co., Lassater Field, Marion County, Tex.	[3] 12.62 [4] 20.1 [5] 19.1	14.65 14.65 14.65
CI68-139 C 4-10-75	Atlantic Richfield Co., P.O. Box 2819 Dallas, Tex. 75221.	Panhandle Eastern Pipe Line Co., Northeast Waynoka Field, Woods County, Okla.	[2] 51.0	14.73
CI69-906 C 6-2-75	Continental Oil Co., P.O. Box 2197, Houston, Tex. 77001.	El Paso Natural Gas Co., Blanco Field, San Juan County, N. Mex.	[6] 38.00186	15.025
CI69-1177 D 6-2-75	Mobil Oil Corp., 3 Greenway Plaza East, Suite 800, Houston, Tex. 77046.	Texas Eastern Transmission Corp., Main Pass Block 6 Field, Federal offshore Louisiana.	Lease released pursuant to the terms of the contract.	....
CI72-842 D 6-2-75	do	Northwest Pipeline Corp., Papoose Canyon Field, Dolores County, Colo.	([7])	....
CI75-712 A 5-21-75	The Superior Oil Co., P.O. Box 1521, Houston, Tex. 77001.	Michigan Wisconsin Pipe Line Co., West Cameron Block 71 Field, offshore Louisiana.	[2] 51.0	14.73
CI75-721 (CI65-1340) B 5-29-75	Roy Furr (Operator) et al., P.O. Box 1650, Lubbock, Tex. 79408.	Panhandle Eastern Pipe Line Co., Brainard No. 1 Well, Hutchison and Roberts Counties, Tex.	Depleted	....
CI75-722 A 5-30-75	Pioneer Production Corp., P.O. Box 2542, Amarillo, Tex. 79105.	El Paso Natural Gas Co., La Huerta Field, Eddy County, N. Mex.	[2] [8] 80.0	14.73
CI75-723 (G-17571) F 6-2-75	Amoco Production Co. (successor to Atlantic Richfield Co.), Security Life Bldg., Denver, Colo. 80202.	El Paso Natural Gas Co., Mocane-Laverne Field, Beaver County, Okla.	[9] 19.7925 [10] 27.4337	14.65 14.65
CI75-724 A 6-2-75	Exchange Oil & Gas Corp., 16th Floor, 1010 Common St., New Orleans, La. 70112.	Texas Gas Transmission Corp., Bayou Piquant Field, Terrebonne Parish, La.	[11] 87.7840	15.025
CI75-725 A 6-2-75	Belco Petroleum Corp., 2500 First City National Bank Bldg., Houston, Tex. 77002.	Tennessee Gas Pipeline Co., a division of Tenneco Inc., Big Mouth Bayou Field, Cameron Parish, La.	[12] 21.5 [13] 48.525	15.025 15.025
CI75-726 (CI61-1188) B 6-5-75	Amoco Production Co., Security Life Bldg., Denver, Colo. 80202.	Colorado Interstate Gas Co., a division of Colorado Interstate Corp., Southwest Camp Creek Field, Beaver County, Okla.	Wells plugged and abandoned.	....
CI75-727 A 6-5-75	do	Panhandle Eastern Pipe Line Co., West Vici Field, Ellis County, Okla.	[14] 60.378	14.73
CI75-728 A 6-6-75	Dorchester Exploration, Inc., 1204 Vaughn Bldg., Midland, Tex. 79701.	United Gas Pipe Line Co., Oakes Field, Claiborne Parish, La.	[15] 60.3712 [16] 61.4167	15.025 15.025

Filing code:
A—Initial service.
B—Abandonment.
C—Amendment to add acreage.
D—Amendment to delete acreage.
E—Succession.
F—Partial succession.

See footnotes at end of table.

[1] Includes 3.254/M ft³ upward British thermal unit adjustment.

[2] Subject to upward and downward British thermal unit adjustment.

[3] Rate for sales from Mar. 1, 1975, until June 4, 1975; including tax reimbursement.

[4] Rate for gathered gas for sales on and after June 5, 1975.

[5] Rate for ungathered gas for sales on and after June 5, 1975.

[6] Includes 3.29091/M ft³ tax reimbursement and is subject to upward and downward British thermal unit adjustment.

[7] Nonproductive acreage assigned to Mesa Petroleum Co. and Atom, Inc., small producers.

[8] Applicant is willing to accept a certificate in accordance with section 2.56a of the commission's general policy and interpretations.

[9] Rate for sales from time of assignment to July 1, 1975.

[10] Rate for sales on and after Jan. 1, 1975; includes 0.4337/M ft³ tax reimbursement for processed gas and is subject to upward and downward British thermal unit adjustment for by-pass gas.

[11] Includes 7/M ft³ tax reimbursement and 4.284/ M ft³ upward British thermal unit adjustment.

[12] Rate for sales prior to July 31, 1974.

[13] Rate for sales on and after July 31, 1974; Applicant is willing to accept a certificate at the Southern Louisiana area rate of 26/M ft³ until Sept. 30, 1974, and 27/M ft³ thereafter.

[14] Includes 3.889/M ft³ tax reimbursement and 5.489/M ft³ upward British thermal unit adjustment.

[15] Rate for sales from July 22, 1974 to Dec. 31, 1974; includes 1.35/M ft³ upward British thermal unit adjustment, 7/M ft³ tax reimbursement and 1.02/M ft³ gathering allowance.

[16] Rate for sales on and after Jan. 1, 1975; includes 1.3755/M ft³ upward British thermal unit adjustment, 7/M ft³ tax reimbursement and 1.02/M ft³ gathering allowance.

[FR Doc.75-16403 Filed 6-24-75;8:45 am]

[Docket No. CP75-15]

UNITED GAS PIPE LINE CO.

Initiating Review of Initial Decision

JUNE 18, 1975.

On May 12, 1975, Presiding Administrative Law Judge Benkin issued an initial decision in the above-designated matter. Briefs on exceptions to the initial decision were due to be filed on June 11, 1975. On June 12, 1975, the Staff filed a brief on exceptions.

Inasmuch as no exceptions to the initial decision were timely filed, absent this order the initial decision would become final on June 21, 1975, i.e., within ten days from the time for filing exceptions. Accordingly, pursuant to § 1.30(d)(2) of the Commission's rules of practice and procedure, the Commission herein initiates review of the initial decision of May 12, 1975, provides for the filing of briefs opposing exceptions on or before July 2, 1975, and further orders that said initial decision is stayed pending a final decision by the Commission in this proceeding.

By direction of the Commission.

MARY B. KIDD,
Acting Secretary.

[FR Doc.75-16478 Filed 6-24-75;8:45 am]

[Docket No. E-9492]

UTAH POWER & LIGHT CO.

Filing of Exchange and Transfer Agreement

JUNE 18, 1975.

Take notice that on June 12, 1975, Utah Power & Light Company (Company) tendered for filing an Exchange and Transfer Agreement between the Company and the Bonneville Power Administration (Administrator). The agreement is dated April 3, 1973. The Company requests waiver of the Commission's notice requirements so that the effective date for the filing be established as the last day of the billing period containing the April 3, 1975 date of execution. The agreement supercedes Company Rate Schedules FPC Nos. 97 and 100.

Any person desiring to be heard or to protest said filing should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street NE., Washington, D.C. 20426, in accordance with Sections 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on on or before July 10, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc. 75-16479 Filed 6-24-75;8:45 am]

[Docket No. E-9493]

WISCONSIN POWER & LIGHT CO.

Filing Wholesale Power Agreement

JUNE 18, 1975.

Take notice that on June 12, 1975, Wisconsin Power and Light Company (WPL) tendered for filing a Wholesale Power Agreement dated May 28, 1975, between Waushara Electric Cooperative and Wisconsin Power and Light Company. WPL states that this contract will supersede an existing contract for wholesale electric service dated May 12, 1967.

WPL states that a copy of the Wholesale Power Agreement and the filing have been provided to Waushara Electric Cooperative.

Any person desiring to be heard or to protest said filing should file a petition to intervene or protest with the Federal Power Commission, 825 North Capitol Street, NE., Washington, D.C. 20426, in accordance with §§ 1.8 and 1.10 of the Commission's rules of practice and procedure (18 CFR 1.8, 1.10). All such petitions or protests should be filed on or before July 2, 1975. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any persons wishing to become a party must file a petition to intervene. Copies of this filing are on file with the Commission and are available for public inspection.

KENNETH F. PLUMB,
Secretary.

[FR Doc.75-16480 Filed 6-24-75;8:45 am]

DEPARTMENT OF JUSTICE

Drug Enforcement Administration

IMPORTATION OF CONTROLLED SUBSTANCES

Application

Pursuant to section 1008 of the Controlled Substance Import and Export Act (21 U.S.C. 958(h)), the Attorney General shall, prior to issuing a registration under this section to a bulk manufacturer of a controlled substance in schedules I or II, and prior to issuing a regulation under section 1002(a) authorizing the importation of such a substance, provide manufacturers holding registrations for the bulk manufacture of the substance an opportunity for a hearing.

Therefore in accordance with § 1311.42 of Title 21, Code of Federal Regulations, notice is hereby given that on May 15, 1975, Applied Science Laboratories, Inc., 139 North Gill Street, Box 440, State College, Pennsylvania 16801, made application to the Drug Enforcement Administration to be registered as an importer of the basic class of controlled substances listed below:

Drug:	*Schedule*
Piminodine	II
3,4-methylenedioxy amphetamine	I
Diethyltryptamine	I
Bufotenine	I
Dimethyltryptamine	I

Any interested party, entitled to a hearing may, on or before July 29, 1975, file written comments on or objections to the issuance of the proposed registration and may, at the same time, file a written request for a hearing on the application (stating with particularity the objections or issues, if any, concerning which the person desires to be heard and a brief summary of his position on those objections or issues).

Comments and objections may be addressed to the Hearing Clerk, Office of Administrative Law Judge, Drug Enforcement Administration, Room 1130, 1405 Eye Street, NW., Washington, D.C. 20537.

Dated: June 16, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16558 Filed 6-24-75;8:45 am]

IMPORTATION OF CONTROLLED SUBSTANCES

Application

Pursuant to section 1008 of the Controlled Substance Import and Export Act (21 U.S.C. 958(h)), the Attorney General shall, prior to issuing a registration under this section to a bulk manufacturer of a controlled substance in schedule I or II, and prior to issuing a regulation under section 1002(a) authorizing the importation of such a substance, provide manufacturers holding registrations for the bulk manufacture of the substance an opportunity for a hearing.

Therefore in accordance with § 1311.42 of Title 21, Code of Federal Regulations, notice is hereby given that the following importers made application to the Drug Enforcement Administration to be registered as importers of the basic class of controlled substances listed below:

Zenith Laboratories, 140 Le Grand Avenue, Northvale, New Jersey 07647 (April 30, 1975):

Drug:	*Schedule*
Amphetamine	II
Methamphetamine	II
Phenmetrazine	II
Methaqualone	II
Amobarbital	II
Secobarbital	II
Pentobarbital	II
Codeine	II
Methylphenidate	II

Arnar-Stone Laboratories, Inc., 601 E. Kensington Road, Mount Prospect, Illinois 60056 (May 21, 1975):

Drug:	*Schedule*
Pentobarbital	II
Methaqualone	II
Codeine	II

Any interested party, entitled to a hearing may, on or before July 31, 1975, file written comments on or objections to the issuance of the proposed registration and may, at the same time, file a written request for a hearing on the application (stating with particularity the objections or issues, if any, concerning which the person desires to be heard and a brief summary of his position on those objections or issues).

Comments and objections may be addressed to the Hearing Clerk, Office of Administrative Law Judge, Drug Enforcement Administration, Room 1130, 1405 Eye Street, NW., Washington, D.C. 20537.

Dated June 18, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16559 Filed 6-24-75;8:45 am]

IMPORTERS OF CONTROLLED SUBSTANCES

Registration

By Notice dated April 8, 1975, and published in the FEDERAL REGISTER on April 17, 1975; (40 FR 17174) the following importers made application to the Drug Enforcement Administration to be registered as importers of the basic class of controlled substances listed below:

Abbott Laboratories, 14th & Sheridan Road, North Chicago, Illinois 60064 (March 26, 1975:

Drug:	*Schedule*
Codeine	II

Burroughs Wellcome Co., Intersection U.S. 13 & S.R. 1584, Post Office Box 1887, Greenville, North Carolina 27834 (January 27, 1975):

Drug:	*Schedule*
Codeine	II

No comments or objections having been received, and, pursuant to Section 1008 of the Comprehensive Drug Abuse Prevention and Control Act of 1970, and in accordance with 21 CFR 1311.42, the above firms are granted registration as importers of the basic class of controlled substances listed for each firm.

Dated: June 16, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16560 Filed 6-24-75;8:45 am]

IMPORTERS OF CONTROLLED SUBSTANCES

Registration

By Notice dated March 26, 1975, and published in the FEDERAL REGISTER on April 1, 1975; (40 FR 14607-08) the following importers made application to the Drug Enforcement Administration to be registered as importers of the basic class of controlled substances listed below:

Sandoz, Inc., Sandoz Pharmaceuticals, 59 Route 10, East Hanover, New Jersey 07936 (December 13, 1974):

Drug:	*Schedule*
Codeine	II

National Pharmaceutical Manufacturing Co. Inc., 4128 Hayward Avenue, Baltimore, Maryland 21215 (February 10, 1975):

Drug:	*Schedule*
Hydrocodone	II
Codeine	II
Opium Extracts	II

Smith, Kline & French Laboratories, Division of Smith, Kline Corporation, 1500 Spring Garden Street, Philadelphia, Pennsylvania 19101 (February 21, 1975):

Drug:	*Schedule*
Amobarbital	II

No comments or objections having been received, and, pursuant to Section 1008 of the Comprehensive Drug Abuse Prevention and Control Act of 1970, and in accordance with 21 CFR 1311.42, the above firms are granted registration as importers of the basic class of controlled substances listed for each firm.

Dated: June 16, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16561 Filed 6-24-75;8:45 am]

[Docket No. 74-22]

NORMAN BRIDGE DRUG CO., MONTGOMERY, ALABAMA

Hearing

Notice is hereby given that on November 4, 1974, the Drug Enforcement Administration, Department of Justice, issued to Norman Bridge Drug Company, Montgomery, Alabama, an Order to Show Cause as to why an application executed September 25, 1974, for renewal of Drug Enforcement Administration registration AN0482769 should not be denied. Also on November 4, 1974, the Drug Enforcement Administration, Department of Justice, issued to Norman Bridge Drug Company an order to show cause as to why Registration Number AN0482769 previously issued to the Respondent should not be revoked.

Thirty days having elapsed since said Orders to Show Cause were received by the Respondent and written request for a hearing having been filed with the Drug Enforcement Administration, a hearing in this matter was scheduled for May 8, 1975, in Montgomery, Alabama.

Pursuant to an agreement of both parties in this matter the hearing scheduled for May 8, 1975, was cancelled and Notice is hereby given that the hearing in this matter will commence at 10 a.m., on July 15, 1975 in the U.S. Magistrate's Hearing Room, 2nd Floor, U.S. Courthouse, Lee & Church Streets, Montgomery, Alabama.

Dated: June 17, 1975.

HENRY S. DOGIN,
Acting Administrator,
Drug Enforcement Administration.

[FR Doc.75-16562 Filed 6-24-75;8:45 am]

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[NM 25904]

NEW MEXICO

Application

JUNE 17, 1975.

Notice is hereby given that, pursuant to section 28 of the Mineral Leasing Act of 1920 (30 U.S.C. 185), as amended by the Act of November 16, 1973 (87 Stat. 576), El Paso Natural Gas Company has applied for a buried underground cable to an existing cathodic protection station right-of-way across the following land:

NEW MEXICO PRINCIPAL MERIDIAN,
NEW MEXICO

T. 26 N., R. 9 W.
Sec. 5, NE¼SE¼.

This cable is necessary to the operation of its natural gas pipelines. It will cross .116 miles of national resource land in San Juan County, New Mexico.

The purpose of this notice is to inform the public that the Bureau will be proceeding with consideration of whether the application should be approved, and if so, under what terms and conditions.

Interested persons desiring to express their views should promptly send their name and address to the District Manager, Bureau of Land Management, 3550 Pan American Freeway, NE, Albuquerque, NM 87107.

FRED E. PADILLA,
Chief, Branch of Lands and
Minerals Operations.

[FR Doc.75-16483 Filed 6-24-75;8:45 am]

[NM 25901 and 25913]

NEW MEXICO

Applications

JUNE 17, 1975.

Notice is hereby given that, pursuant to section 28 of the Mineral Leasing Act of 1920 (30 U.S.C. 185), as amended by the Act of November 16, 1973 (87 Stat. 576), El Paso Natural Gas Company has applied for two 4½ inch natural gas pipeline rights-of-way across the following lands:

New Mexico Principal Meridian,
New Mexico

T. 29 N., R. 8 W.
Sec. 25, SW¼SW¼.
T. 31 N., R. 9 W.
Sec. 33, lots 3 and 4.

These pipelines will convey natural gas across .369 miles of national resource lands in San Juan County, New Mexico.

The purpose of this notice is to inform the public that the Bureau will be proceeding with consideration of whether the applications should be approved, and if so, under what terms and conditions.

Interested persons desiring to express their views should promptly send their name and address to the District Manager, Bureau of Land Management, 3550 Pan American Freeway, NE, Albuquerque, NM 87107.

Fred E. Padilla,
Chief, Branch of Lands and Minerals Operations.

[FR Doc.75-16484 Filed 6-24-75;8:45 am]

[NM 25898, 25899, 25900, 25902, 25903, 25905, 25906, 25907, 25908, 25911, 25912, 25914 and 25915]

NEW MEXICO

Applications

June 18, 1975.

Notice is hereby given that, pursuant to section 28 of the Mineral Leasing Act of 1920 (30 U.S.C. 185), as amended by the Act of November 16, 1973 (87 Stat. 576), El Paso Natural Gas Company has applied for four cathodic protection stations and nine 4½ inch natural gas pipeline rights-of-way across the following lands:

New Mexico Principal Meridian,
New Mexico

T. 28 N., R. 7 W.,
Sec. 9, lot 4;
Sec. 31, lot 5.
T. 31 N., R. 8 W.,
Sec. 28, SW¼NW¼;
Sec. 29, S½NW¼ and NW¼SW¼;
Sec. 31, E½SE¼ and SW¼SE¼;
Sec. 33, S½SE¼.
T. 25 N., R. 9 W.,
Sec. 1, lost 4 and SW¼NW¼.
T. 25 N., R. 10 W.,
Sec. 12, SW¼SE¼.
T. 26 N., R. 10 W.,
Sec. 31, lot 2, N½NE¼ and E½NW¼.
T. 30 N., R. 10 W.,
Sec. 25, lots 2, 3, 7 and 8.
T. 31 N., R. 10 W.,
Sec. 17, lots 3, 5, 6 and 7.
T. 26 N., R. 11 W.,
Sec. 1, lot 4;
Sec. 25, W½NE¼ S½NW¼ and N½SW¼.
T. 27 N., R. 11 W.,
Sec. 36, SW¼SW¼.

These cathodic protection stations and the pipelines will be used to convey natural gas across 4.366 miles of national resources lands in Rio Arriba and San Juan Counties, New Mexico.

The purpose of this notice is to inform the public that the Bureau will be proceeding with consideration of whether the applications should be approved, and if so, under what terms and conditions.

Interested persons desiring to express their views should promptly send their name and address to the District Manager, Bureau of Land Management, 3550 Pan American Freeway, NE, Albuquerque, NM 87107.

Fred E. Padilla,
Chief, Branch of Lands and Minerals Operations.

[FR Doc.75-16845 Filed 6-24-75;8:45 am]

[NM 25909 and 25910]

NEW MEXICO

Applications

June 17, 1975.

Notice is hereby given that, pursuant to section 28 of the Mineral Leasing Act of 1920 (30 U.S.C. 185), as amended by the Act of November 16, 1973 (87 Stat. 576), El Paso Natural Gas Company has applied for two 4½ inch natural gas pipeline rights-of-way across the following land:

New Mexico Principal Meridian,
New Mexico

T. 27 N., R. 7 W.,
Sec. 7, lot 4;
Sec. 20, W½SW¼.

These pipelines will convey natural gas across .272 mile of national resource land in Rio Arriba County, New Mexico.

The purpose of this notice is to inform the public that the Bureau will be proceeding with consideration of whether the applications should be approved, and if so, under what terms and conditions.

Interested persons desiring to express their views should promptly send their name and address to the District Manager, Bureau of Land Management, 3550 Pan American Freeway, NE, Albuquerque, NM 87107.

Fred E. Padilla,
Chief, Branch of Lands and Minerals Operations.

[FR Doc.75-16486 Filed 6-24-75;8:45 am]

[Wyoming 47475]

WYOMING

Designation of Scab Creek Primitive Area

June 17, 1975.

Pursuant to the authority in 43 CFR Part 2070 and Subpart 6221 and authorization from the Director dated August 6, 1974, I hereby designate the following national resource lands as the Scab Creek Primitive Area:

Sixth Principal Meridian, Wyoming

T. 32 N., R. 106 W.,
Sec. 4;
Sec. 5;
Sec. 6;
Sec. 7, lots 3 to 8 inclusive, NE¼NE¼, and NE¼NW¼;
Sec. 8, lots 1 and 2;
Sec. 9, NE¼.
T. 33 N., R. 106 W.,
Sec. 17;
Sec. 20;
Sec. 21; S½;
Sec. 28;
Sec. 29, N½, SE¼, NW¼SW¼, and E½SW¼;
Sec. 32, lots 2, 3, and 4, NE¼, and N½SE¼;
Sec. 33.
T. 32 N., R. 107 W.,
Sec. 1, lots 1, 5, 6, and 7, and SW¼SE¼;
Sec. 12, lots 1 and 2, and W½NE¼.

The area described aggregates about 6,680 acres, of which all are national resource lands.

The Scab Creek Primitive Area is a "Class V—Primitive Area" under the Bureau of Outdoor Recreation system of classification.

Daniel P. Baker,
State Director.

[FR Doc.75-16487 Filed 6-24-75;8:45 am]

[Wyoming 071579]

WYOMING

Application

June 18, 1975.

Notice is hereby given that, pursuant to section 28 of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 185), Mountain Fuel Supply Company has applied for a natural gas pipeline right-of-way across the following lands:

Sixth Principal Meridian, Wyoming

T. 13 N., R. 100 W.,
Secs. 13, 14, 15, 19, 20, 21, and 30.
T. 13 N., R. 101 W.,
Secs. 25, 34, and 35.

The pipeline will convey natural gas from the Pioneer Field in sec. 13, T. 13 N., R. 100 W. to an existing pipeline in sec. 34, T. 13 N., R. 101 W.

The purpose of this notice is to inform the public that the Bureau will be proceeding with consideration of whether the application should be approved and, if so, under what terms and conditions.

Interested persons desiring to express their views should send their name and address to the District Manager, Bureau of Land Management, P.O. Box 1869, Rock Springs, WY 82901.

Philip C. Hamilton,
Chief, Branch of Lands and Minerals Operations.

[FR Doc.75-16541 Filed 6-24-75;8:45 am]

Bureau of Reclamation

COMPLETION OF LYMAN PROJECT, WYOMING

Public Hearing on Draft Environmental Statement

Pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969, the Department of the Interior has prepared a draft environmental statement covering completion of the authorized Lyman Project in southwestern Wyoming. This statement (INT DES 75-34) is dated May 28, 1975, and was made available to the public on June 9, 1975.

The draft environmental statement deals with the construction of an earthfill dam on the Smiths Fork drainage as a second stage to regulatory storage already provided on Blacks Fork by Meeks Cabin Reservoir. Alternative damsites are located in Summit County, Utah, and Uinta County, Wyoming. The impounded reservoir would provide supplemental water for 10,000 acres of irrigated land and an additional municipal supply for Bridger Valley communities. It would also provide fish and wildlife and recreation benefits.

A public hearing will be held in Mountain View, Wyoming, to receive comments relating to the draft environmental statement. It will be held in the auditorium of the Mountain View High School at Mountain View, Wyoming, beginning at 2 p.m., July 23, 1975. The hearing will continue until all applicants have been heard.

The draft environmental statement is available for public review at the Regional Office of the Bureau of Reclamation, Room 7223, Federal Building, 125 South State Street (P.O. Box 11568), Salt Lake City, Utah 84111, or at the Bureau's field office at the Government Camp on the western edge of Mountain View, Wyoming. Individual copies of the statement may be obtained without charge by writing to the Regional Director, Salt Lake City. Copies of the statement are also available at the Uinta County Public Library, Evanston, Wyoming; the Sweetwater County Library, Green River, Wyoming; and the Western Wyoming College Library, Rock Springs, Wyoming.

Individual oral statements at the hearing will be limited to 10 minutes. Any person desiring additional time must secure prior approval. An oral statement may be supplemented by a written statement which may be submitted to the hearing officer at the time of presentation of the oral statement or mailed to the Regional Office of the Bureau of Reclamation in Salt Lake City. Each organization wishing to present oral testimony will be limited to one individual unless prior approval is obtained. Approval for additional time or witnesses must be obtained from the Regional Director. To the extent that time is available after presentation of oral statements by those who have given advance notice, the hearing officer will give others present an opportunity to be heard.

Organizations or individuals desiring to present statements at the hearing should contact Regional Director David L. Crandall, Bureau of Reclamation, Room 7201, 125 South State Street, Salt Lake City, Utah 84111 (telephone 801-524-5592), prior to 4:30 p.m., July 18, 1975. Speakers will be scheduled according to the time mentioned in their letter or telephone request whenever possible. Any scheduled speaker not present when called will lose the privilege in his scheduled order and his name will be recalled at the end of the scheduled speakers. Written comments from those unable to attend the hearing or those wishing to supplement their oral presentation at the hearing may be submitted to the Regional Director until August 1, 1975, for inclusion in the hearing record.

Dated: June 19, 1975.

JAMES J. O'BRIEN,
Acting Commissioner of Reclamation.

[FR Doc.75-16531 Filed 6-24-75;8:45 am]

DEPARTMENT OF AGRICULTURE

Forest Service

SOUTH FORK PAYETTE RIVER PLANNING UNIT

Availability of Final Environmental Statement

Pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969, the Forest Service, Department of Agriculture, has prepared a final environmental statement for the South Fork Payette River Planning Unit, Boise National Forest, Idaho. The Forest Service report number is USDA-FS-FES (Adm) R4-75-12.

The environmental statement identifies and evaluates the probable effects of the land use plan for the South Fork Payette River Planning Unit on the Boise National Forest in south-central Idaho. The purpose of the plan is to allocate National Forest lands within the unit to specific resource uses and activities; establish management objectives; document management direction, decisions, and necessary coordination between resource uses and activities; and provide for the protection, use, and development of the various resources within the planning unit. The plan provides for minimization of adverse effects. Minor adverse effects from some development activities will be temporary stream sedimentation and short periods of air pollution. Major resource activities will be monitored so that tolerable levels of sedimentation will not be exceeded in the South Fork Payette River.

The plan provides for a moderate level of consumptive resource uses with significant areas remaining undeveloped with options for future management remaining open.

Copies are available for inspection during regular working hours at the following locations:

USDA, Forest Service
South Agriculture Bldg., Room 3230
12th St. and Independence Ave., SW
Washington, D.C. 20250

Regional Planning Office
USDA, Forest Service
Federal Building, Room 4403
Ogden, Utah 84401

Forest Supervisor
Boise National Forest
1075 Park Boulevard
Boise, Idaho 83706

District Forest Ranger
Lowman Ranger District
Idaho Building, Room 517
Boise, Idaho 83702

A limited number of single copies are available upon request to Forest Supervisor Edward C. Maw, Boise National Forest, 1075 Park Boulevard, Boise, Idaho 83706.

Copies of the environmental statement have been sent to various Federal, State, and local agencies as outlined in the CEQ Guidelines.

Dated: June 18, 1975.

P. M. REES,
Director,
Regional Planning and Budget.

[FR Doc.75-16539 Filed 6-24-75;8:45 am]

UNION COUNTY GRAZING ADVISORY BOARD

Meeting

The Union County Grazing Advisory Board will meet Thursday, July 24, 1975, at 9 a.m., in the District Ranger's Office, Kiowa National Grassland, 16 North Second Street, Clayton, New Mexico 88415.

The purpose of this meeting will be for organizational purposes. Election of officers will be held during this meeting.

The meeting will be open to the public. Persons who wish to attend should notify District Ranger Alton Bryant via telephone, 374-9652, or in writing to Ranger Bryant, 16 North Second Street, Clayton, New Mexico 88415. Written statements may be filed with the committee before or after the meeting.

Dated: June 17, 1975.

WALLACE L. LLOYD,
Forest Supervisor.

[FR Doc.75-16538 Filed 6-24-75;8:45 am]

Packers and Stockyards Administration

MOORES' LIVESTOCK AUCTION NORCO, CALIFORNIA, ET AL.

Posted Stockyards

The Chief, Registrations, Bonds, and Reports Branch, Packers and Stockyards Administration, United States Department of Agriculture, has information that the livestock markets named below are stockyards as defined in section 302 of the Packers and Stockyards Act, 1921, as amended (7 U.S.C. 202), and should be made subject to the provisions of the Act.

CA-167 Moores' Livestock Auction, Norco, Calif.
GA-180 Wayne County Stockyard, Jesup, Ga.
IL-166 Benton Livestock Sale, Benton, Ill.
MD-118 Meteor Stables, Inc., Capitol Heights, Md.
MA-106 Johnny's Livestock Sales, Swansea, Mass.
NY-154 Empire Livestock Marketing Cooperative, Inc., Bath, N.Y.
TX-312 Nacogdoches County Livestock Arena, Inc., Nacogdoches, Tex.

Notice is hereby given, therefore, that the said Chief, pursuant to authority delegated under the Packers and Stockyards Act, 1921, as amended (7 U.S.C. 181 *et seq.*), proposes to issue a rule designating the stockyards named above as posted stockyards subject to the provisions of the Act as provided in section 302 thereof.

Any person who wishes to submit written data, views, or arguments concerning the proposed rule, may do so by filing them with the Chief, Registrations, Bonds, and Reports Branch, Packers and Stockyards Administration, United States Department of Agriculture, Washington, D.C. 20250, by July 10, 1975.

All written submissions made pursuant to this notice shall be made available for public inspection at such times and places in a manner convenient to the public business (7 U.S.C. 1.27(b)).

Done at Washington, D.C., this 16th day of June, 1975.

EDWARD L. THOMPSON,
Chief, Registrations, Bonds, and Reports Branch Livestock Marketing Division.

[FR Doc.75-16502 Filed 6-24-75;8:45 am]

TOBESOFKEE LIVESTOCK MACON, GEORGIA, ET AL.

Posted Stockyards

Pursuant to the authority delegated under the Packers and Stockyards Act, 1921, as amended (7 U.S.C. *et seq.*), it was ascertained that the livestock markets named below were stockyards within the definition of that term contained in section 302 of the Act, as amended (7 U.S.C. 202), and notice was given to the owners and to the public by posting notices at the stockyards as required by said section 302, on the respective dates specified below.

Facility number, name, location of stockyard, and date of posting

GEORGIA

GA-179 Tobesofkee Livestock, Macon, May 1, 1975.

KANSAS

KS-199 Rush County Livestock Sales Co., LaCrosse, Feb. 1, 1975.

MINNESOTA

MN-166 Perham Livestock Auction, Perham, May 9, 1975.

MISSOURI

MO-239 South Central Livestock Market, Inc., Vienna, May 28, 1975.

MONTANA

MT-117 Great Falls Livestock Market Center, Great Falls, March 20, 1975.

OKLAHOMA

OK-194 Tonkawa Auction Center, Tonkawa, May 1, 1975.

TENNESSEE

TN-173 Athens Livestock Auction Company, Inc., Athens, May 13, 1975.

TEXAS

TX-311 Lone Star Livestock Commission Co., San Antonio, May 1, 1975.

VIRGINIA

VA-148 Southampton Livestock Sales, Inc., Courtland, May 2, 1975.

Done at Washington, D.C., this 16th day of June, 1975.

EDWARD L. THOMPSON,
Chief, Registrations, Bonds, and Reports Branch, Livestock Marketing Division.

[FR Doc.75-16503 Filed 6-24-75;8:45 am]

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Food and Drug Administration

[Docket No. 75G-0117]

AMERICAN BOTTLED WATER ASSOCIATION

Filing of Petition for Affirmation of GRAS Status

Pursuant to provisions of the Federal Food, Drug, and Cosmetic Act (secs. 201 (s), 409, 701(a), 52 Stat. 1055, 72 Stat. 1784-1788; 21 U.S.C. 321(s), 348, 371(a)) and the regulations for affirmation of GRAS status (21 CFR 121.40), published in the FEDERAL REGISTER of December 2, 1972 (37 FR 25705), notice is given that a petition (GRASP 4G0043) has been filed by American Bottled Water Association, 1411 West Olympic Blvd., Los Angeles, CA 90015 and placed on public display at the office of the Hearing Clerk, Food and Drug Administration, proposing affirmation that ozone used to disinfect bottled water is generally recognized as safe (GRAS).

Any petition which meets the format requirements outlined in 21 CFR 121.40 is filed by the Food and Drug Administration. There is no prefiling review of the adequacy of data to support a GRAS conclusion. Thus, the filing of a petition for GRAS affirmation should not be interpreted as a preliminary indication of suitability for affirmation.

Interested persons may, on or before August 25, 1975, review the petition and/or file comments (preferably in quintuplicate) with the Hearing Clerk, Food and Drug Administration, Rm. 4-65, 5600 Fishers Lane, Rockville, MD 20852. Comments should include any available information that would be helpful in determining whether the substance is, or is not, generally recognized as safe. A copy of the petition and received comments may be seen in the office of the Hearing Clerk, address given above, during working hours, Monday through Friday.

Dated: June 18, 1975.

HOWARD R. ROBERTS,
Acting Director, Bureau of Foods.

[FR Doc.75-16513 Filed 6-24-75;8:45 am]

National Institutes of Health

CANCER RESEARCH CENTER REVIEW COMMITTEE

Renewal

The Director, National Institutes of Health, announces the renewal on May 28, 1975, of the advisory committee indicated below by the Director, National Cancer Institute, under the authority of section 410A(a) of the Public Health Service Act (42 U.S.C. 286e). Such advisory committee shall be governed by the provisions of the Federal Advisory Committee Act (Pub. L. 92-463) setting forth standards governing the establishment and use of advisory committees.

Name. Cancer Research Center Review Committee.

Purpose. The Committee provides to the Director, NCI, advice on the scientific merit of applications for planning studies, clinical and specialized research centers, program project grants, and core grants related to the cancer problem. This Committee will terminate December 20, 1976, unless renewed by appropriate action as authorized by law.

Dated: June 18, 1975.

R. W. LAMONT-HAVERS,
Acting Director, National Institutes of Health.

[FR Doc.75-16492 Filed 6-24-75;8:45 am]

THROMBOSIS SPECIALIZED CENTERS OF RESEARCH AD HOC REVIEW COMMITTEE

Establishment

The National Institutes of Health announces the establishment on June 19, 1975, of the public advisory committee, Thrombosis Specialized Centers of Research (SCOR) ad hoc Review Committee, under the authority of section 222 of the Public Health Service Act (42 U.S.C. 217a). This advisory committee shall be governed by the provisions of the Federal Advisory Committee Act (Pub. L. 92-463) setting forth standards governing the establishment and use of advisory committees.

This committee shall advise the Secretary, the Assistant Secretary for Health, and the Director, National Institutes of Health, concerning scientific merit review of competing grant applications and provide technical advice to the National Heart and Lung Advisory Council and to the Director, National Heart and Lung Institute.

Authority for this committee will expire April 1, 1976, unless the Secretary, DHEW, formally determines that continuance is in the public interest.

(Catalog of Federal Domestic Assistance Program No. 13.837, National Institutes of Health)

Dated: June 19, 1975.

R. W. LAMONT-HAVERS,
Acting Director, National Institutes of Health.

[FR Doc.75-16493 Filed 6-24-75;8:45 am]

Office of the Assistant Secretary for Planning and Evaluation

[Contract No. HEW-100-75-0111]

PREDICTING DROPOUT RATES, UNDERSTANDING PROGRAM SUCCESS, AND PROGRAM EFFECTS IN MANPOWER TRAINING PROGRAMS

Contract Award

Pursuant to section 606 of the Community Services Act of 1974, 42 U.S.C. 2946, this agency announces the award of Contract Number HEW-100-75-0111 to TEAM Associates, Incorporated, 1522 K Street NW., Washington, D.C. for a data analysis project entitled "Predicting Dropout Rates, Understanding Program Success, and Post-Program Effects in Manpower Training Programs." The purpose of this project is to identify factors explaining length of stay in manpower training programs and to evaluate manpower training programs focusing on effective variables. The data base is from the OEO Longitudinal Manpower Training Evaluation and includes MDTA, JOBS, NYC, and Job Corps. The estimated cost of this contract is $109,952. The intended completion date is May 15, 1976.

Dated: May 19, 1975.

WILLIAM A. MORRILL,
Assistant Secretary for Planning and Evaluation.

[FR Doc.75-16497 Filed 6-24-75;8:45 am]

[Contract No. HEW-100-75-0113]

YEAR-ROUND SCHOOLS EVALUATION DESIGN

Contract Award

Pursuant to section 606 of the Community Services Act of 1974, 42 U.S.C. 2946, this agency announces the award of Contract Number HEW-100-75-0113 to ABT Associates, 55 Wheeler Street, Cambridge, Massachusetts 02138 for a research project titled "Year-Round Schools Evaluation Design." The purpose of this project is to identify the importance and potential of year-round schools and to propose a program of needed research and evaluation into the conduct and impact of year-round schools, focusing on how a year-round calendar meets the special needs of the educationally and economically disadvantaged. The estimated cost of this contract is $46,029 and the expected completion date is October 9, 1975.

Dated: May 19, 1975.

WILLIAM A. MORRILL,
Assistant Secretary for Planning and Evaluation.

[FR Doc.75-16498 Filed 6-24-75;8:45 am]

YEAR-ROUND SCHOOLS EVALUATION—PHASE I

Program Results

Pursuant to section 606 of the Community Services Act of 1974, 42 U.S.C. 2946, this agency announces the completion of activities associated with an HEW project entitled, "Year-Round Schools Evaluation—Phase I." Two reports were prepared, the first describes the various types of year-round schools and identifies the objectives, impacts, promises of and criticisms of each model. The second report is an exhaustive bibliography on year-round schools including a summary of evaluation studies conducted on year-round programs.

A copy of these reports will be filed and available as soon as possible, from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151.

Dated: May 19, 1975.

WILLIAM A. MORRILL,
Assistant Secretary for Planning and Evaluation.

[FR Doc.75-16499 Filed 6-24-75;8:45 am]

Office of the Secretary

BOARD OF ADVISORS TO THE FUND FOR THE IMPROVEMENT OF POSTSECONDARY EDUCATION

Public Meeting

Notice is hereby given, pursuant to section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-453), that the next meeting of the Board of Advisors to the Fund for the Improvement of Postsecondary Education will be held on July 17, 1975, beginning at 9:00 a.m. to July 18, 1975 at 5:00 p.m. at the Clift Hotel in San Francisco, California. The meeting will be for the sole purpose of considering and formulating advice to the Director of the Fund regarding policy and guidelines for fiscal 1976 programs.

The meeting will be open to the public. A summary of the proceedings of the meeting and a roster of members may be obtained from the Fund for the Improvement of Postsecondary Education, 400 Maryland Avenue, SW., Room 3141, Washington, D.C. 20202, telephone 202-245-8091.

Signed at Washington, D.C., on June 18, 1975.

VIRGINIA B. SMITH,
Director, Fund for the Improvement of Postsecondary Education.

[FR Doc.75-16494 Filed 6-24-75;8:45 am]

NATIONAL ADVISORY COUNCIL ON SERVICES AND FACILITIES FOR THE DEVELOPMENTALLY DISABLED

Meeting

The National Advisory Council on Services and Facilities for the Developmentally Disabled was established, by section 133(a)(1) of Pub. L. 91-517, which was signed on October 30, 1970, to advise the Secretary with respect to any regulations promulgated or proposed to be promulgated by him in the implemenation of the Act and study and evaluate programs authorized by the Act with a view to determining their effectiveness in carrying out the purposes for which they were established.

Notice is hereby given, pursuant to Pub. L. 92-463 that the National Advisory Council on Services and Facilities for the Developmentally Disabled will hold a meeting on July 21 and 22, 1975. The meeting will be in Room 5051, Health, Education, and Welfare North Building, 330 Independence Avenue, SW., Washington, D.C. from 9 a.m. to 5 p.m. on July 21 and 9 a.m. to 3:30 p.m. on July 22. Agenda: Presentation of the objectives for the Division of Developmental Disabilities and the NACSFDD for the next 3 to 5 years; setting up priorities for the Division of Developmental Disabilities as well as for the NACSFDD; discussion of the budget for the NACSFDD; discussion with representatives of the Bureau of Education of the Handicapped, Rehabilitation Services Administration, Social and Rehabilitation Service, National Institute of Child Health and Human Development, National Institute of Neurological Disease and Stroke, National Institute of Mental Health, and such other representatives of the agencies as pertain to developmental disabilities; Reports from the following Working Groups: Liaison wth the States; Deinstitutionalization and Community Alternatives; Projects; and University Affiliated Facilities; and Recommendations to the Secretary. This meeting will be open for public observation.

Further information on the Council may be obtained from Francis X. Lynch, Executive Secretary, National Advisory Council on Services and Facilities for the Developmentally Disabled, Room 3014 South HEW Building, 330 C Street, SW., Washington, D.C. 20201, telephone: Area Code 202/245-0335.

FRANCIS X. LYNCH,
Executive Secretary, National Advisory Council on Services and Facilities for the Developmentally Disabled.

JUNE 20, 1975.

[FR Doc.75-16495 Filed 6-24-75;8:45 am]

OFFICE OF INVESTIGATIONS AND SECURITY

Statement of Organization, Functions, and Delegation of Authority; Amendment

Part 1 of the Statement of Organization, Functions, and Delegations of Authority of the Department of Health, Education, and Welfare is amended to change section 1T70 "Office of Investigations and Security" (38 FR 16411), June 22, 1973 as follows:

Under § 1T70.20 3A, Personnel Security Branch, delete the following:

"(5) carries out any other functions as assigned for the establishment and maintenance of personnel security within the Department."

Date: June 16, 1975.

JOHN OTTINA,
Assistant Secretary for Administration and Management.

[FR Doc.75-16537 Filed 6-24-75;8:45 am]

DEPARTMENT OF TRANSPORTATION

Coast Guard

[CGD 75-132]

EQUIPMENT, CONSTRUCTION, AND MATERIALS

Approval Notice

1. Certain laws and regulations (46 CFR Chapter I) require that various items of lifesaving, firefighting and miscellaneous equipment, construction, and materials used on board vessels subject to Coast Guard inspection, on certain motorboats and other recreational vessels, and on the artificial islands and fixed structures on the outer Continental Shelf be of types approved by the Commandant, U.S. Coast Guard. The purpose of this document is to notify all interested persons that certain approvals have been granted as herein described during the period from April 1, 1975 to April 25, 1975 (List No. 10-75). These actions were

taken in accordance with the procedures set forth in 46 CFR 2.75-1 to 2.75-50.

2. The statutory authority for equipment, construction, and material approvals is generally set forth in sections 367, 375, 390b, 416, 481, 489, 526, and 1333 of Title 46, United States Code, section 1333 of Title 43, United States Code, and section 198 of Title 50, United States Code. The Secretary of Transportation has delegated authority to the Commandant, U.S. Coast Guard with respect to these approvals (49 CFR 1.46(b)). The specifications prescribed by the Commandant, U.S. Coast Guard for certain types of equipment, construction, and materials are set forth in 46 CFR Parts 160 to 164.

3. The approvals listed in this document shall be in effect for a period of 5 years from the date of issuance, unless sooner cancelled or suspended by proper authority.

HATCHETS (LIFEBOATS AND LIFE RAFTS) FOR MERCHANT VESSELS

Approval No. 160.013/5/0, hatchet steel handle, Estwing Model E-3-24A, Type I, Class I, Design E, Style 2, Revere's dwg. B-692-2 dated May 8, 1970, Model RSCH-12, manufactured by Revere Supply Company, Inc., 603-607 West 29th Street, New York, New York 10001, effective April 11, 1975. (It is an extension of Approval No. 160.013/5/0 dated May 28, 1970.)

Approval No. 160.013/6/0, hatchet steel handle, Vaughn Model A 1½, Type I, Class I, Design E, Style 2, Revere's dwg. B-692-3 dated May 8, 1970, Model RSCH-13, manufactured by Revere Supply Company, Inc., 603-607 West 29th Street, New York, New York 10001, effective April 11, 1975. (It is an extension of Approval No. 160.013/6/0 dated May 28, 1970.)

LADDERS, EMBARKATION-DEBARKATION (FLEXIBLE), FOR MERCHANT VESSELS

Approval No. 160.017/41/0, Master Safety Ladder Model No. 1005A, Type II, embarkation-debarkation ladder, chain suspension (8-0 lock link chain) steel ears, dwg. No. 16656-0, dated February 19, 1970, approval limited to ladders 80 feet or less in length, manufactured by Roberton and Schwartz, Inc., 480 Potrero Avenue, San Francisco, California 94110, effective April 11, 1975. (It supersedes Approval No. 160.017/41/0 dated May 6, 1970 to show change in length and address of the manufacturer.)

LIFEBOATS

Approval No. 160.035/286/4, 24.0′ x 8.0′ x 3.5′ steel, oar-propelled lifeboat, 40-person capacity, identified by construction and arrangement dwg. No. 24-9, Rev. H dated April 17, 1970, 46 CFR 160.035-13(c) Marking, Weights: Condition "A"=3,040 pounds; Condition "B"=10,540 pounds, manufactured by Marine Safety Equipment Corporation, Foot of Wycoff Road, Farmingdale, New Jersey 07727, effective April 11, 1975. (It is an extension of Approval No. 160.035/286/4 dated May 12, 1970.)

Approval No. 160.035/459/0, 26.0′ x 9.0′ x 3.83′ fibrous glass reinforced plastic (FRP), oar-propelled lifeboat, 53-person capacity, identified by general arrangement dwg. No. P-26-2A, Rev. A dated April 24, 1970, 46 CFR 160.035-13(c) Marking Weights: Condition "A"=3,220 pounds; Condition "B"=13,063 pounds, manufactured by Marine Safety Equipment Corporation, Foot of Wycoff Road, Farmingdale, New Jersey 07727, effective April 11, 1975. (It is an extension of Approval No. 160.035/459/0 dated May 5, 1970.)

Approval No. 160.035/461/0, 26.0′ x 9.0′ x 3.83′ fibrous glass reinforced plastic (FRP), hand-propelled lifeboat, 53-person capacity, identified by general arrangement dwg. No. P-26-2B, Rev. A dated May 12, 1970, 46 CFR 160.035-13 (c) Marking, Weights: Condition "A"=3,807 pounds; Condition "B"=13,519 pounds, manufactured by Marine Safety Equipment Corporation, Fort of Wycoff Road, Farmingdale, New Jersey 07727, effective April 11, 1975. (It is an extension of Approval No. 160.035/461/0 dated May 28, 1970.)

INFLATABLE LIFE RAFTS

Approval No. 160.051/62/0, inflatable life raft, 10-person capacity, identified by general arrangement dwg. RFD-US-1048, revision No. 6 dated February 13, 1975, and Specification RFD-US-100, revision No. 3, dated December 9, 1974, satisfied temperature-exposure inflation requirements of 46 CFR 60.05-5(e) (11) as revised in Federal Register of March 13, 1974, manufactured by B. F. Goodrich, Engineered Systems Company, Union, West Virginia 24983, effective April 1, 1975.

Approval No. 160.051/71/0, 4-person inflatable life raft; identified by general arrangement drawing SPC-MM-4002 (Rev. 7) dated April 6, 1973, and drawing list SPC-MM-4, revised February 7, 1975, satisfies temperature-exposure inflation requirements of 46 CFR 160.051-5(a) (11) as revised in Federal Register of March 13, 1974, manufactured by Switlik Parachutes Company, Inc., 1325 East State Street, Trenton, New Jersey 08607, effective April 17, 1975.

MARINE BUOYANT DEVICE

Approval No. 160.064/673/0, adult small, Model S, cloth covered unicellular plastic foam "Buoyant Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 202,, factory location: Clan Robertson, 1752 N. 55th Street, Boulder, Colorado 80302, Type III PFD, manufactured by A. B. Sea LTD., P.O. Box 9364, Denver, Colorado 80209, effective April 15, 1975. (It supersedes Approval No. 160.064/673/0 dated July 30, 1974 to show change of address of manufacturer and addition of factory location.)

Approval No. 160.064/674/0, adult medium Model S, cloth covered unicellular plastic foam "Buoyant Vest," manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 202, factory location: Clan Robertson, 1752 N. 55th Street, Boulder, Colorado 80302, Type III PFD, manufactured by A. B. Sea LTD., P.O. Box 9364, Denver, Colorado 80209 effective April 5, 1975. (It supersedes Approval No. 160.064/674/0 dated July 30, 1974 to show change of address of manufacturer and addition of factory location.)

Approval No. 160.064/675/0, adult large, Model S, cloth covered unicellular plastic foam "Buoyant Vest," manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 202, factory location: Clan Robertson, 1752 N. 55th Street, Boulder, Colorado 80302, Type III PFD, manufactured by A. B. Sea LTD., P.O. Box 9364, Denver, Colorado 80209, effective April 15, 1975. (It supersedes Approval No. 160.064/675/0 dated July 30, 1974 to show change of address of manufacturer and addition of. factory location.)

Approval No. 160.064/776/0, child medium, Model No. 531, cloth covered unicellular plastic foam "Ski or Fishing Vest," manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 211, factory location: 301 Mulberry Street, Pine Bluff, Arkansas 71601, Type III PFD, manufactured by Himalayan Industries, Inc., P.O. Box 5668, Pine Bluff, Arkansas 71601, effective April 17, 1975.

Approval No. 160.064/842/0, adult, Model No. 5020, cloth covered unicellular plastic foam "Sailing Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 222, Type III PFD, manufactured by The Empress Corporation, 1144 S. San Julian Street, Los Angeles, California 90015 for Nihon Kyumeikigu Manufacturing Company, Ltd., Yamura Factory, 500 Shimoya Tsurushi, Yamanashi-Ken, Japan, effective April 2, 1975.

Approval No. 160.064/843/0, adult, Model No. 5020, cloth covered unicellular plastic foam "Sailing Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 222, Type III PFD, manufactured by The Empress Corporation, 1144 S. San Julian Street, Los Angeles, California 90015 for Nihon Kyumeikigu Manufacturing Company, Ltd., Yamura Factory, 500 Shimoya Tsurushi, Yamanashi-Ken, Japan, effective April 2, 1975.

Approval No. 160.064/844/0, child medium, Model No. 5030, cloth covered unicellular plastic foam "Sailing Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 222, Type III PFD, manufactured by The Empress Corporation, 1144 S. San Julian Street, Los Angeles, California 90015 for Nihon Kyumeikigu Manufacturing Company, Ltd., Yamura Factory, 500 Shimoya Tsurushi, Yamanashi-Ken, Japan, effective April 2, 1975.

Approval No. 160.064/845/0, child medium, Model No. 5030, cloth covered unicellular plastic foam "Sailing Vest", manufactured in accordance with U.S. C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 222, Type III PFD, manufactured by The Empress Corporation, 1144 S. San Julian Street, Los Angeles, California 90015 for Nihon Kyumeikigu Manufacturing Company, Ltd., Yamura Factory, 500 Shimoya Tsurushi, Yamanashi-Ken, Japan, effective April 2, 1975.

Approval No. 160.064/854/0, child small, Model No. 530, cloth covered unicellular plastic foam "Ski or Fishing Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 211, factory location: 301 Mulberry Street, Pine Bluff, Arkansas 71601, Type III PFD, manufactured by Himalayan Industries, Inc., P.O. Box 5668, Pine Bluff, Arkansas 71601, effective April 17, 1975.

Approval No. 160.064/874/0, child medium, Model No. CV-SM, vinyl dipped unicellular plastic foam "Water Ski Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 114, Type III PFD, manufactured by Cut 'N' Jump Ski Corporation, 11525 Sorrento Valley Road, San Diego, California 92121 for Burbank Ski Company, 1855 Victory Place, Burbank, California 91504, effective April 2, 1975.

Approval No. 160.064/875/0, adult, Model No. CV-MD, vinyl dipped unicellular plastic foam "Water Ski Vest", manufactured in accordance with U.S. C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 114, Type III PFD, manufactured by Cut 'N' Jump Ski Corporation, 11525 Sorrento Valley Road, San Diego, California 92121 for Burbank Ski Company, 1855 Victory Place, Burbank, California 91504, effective April 2, 1975.

Approval No. 160.064/876/0, adult, Model No. CV-LG, vinyl dipped unicellular plastic foam "Water Ski Vest", manufactured in accordance with U.S. C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 114, Type III PFD, manufactured by Cut 'N' Jump Ski Corporation, 11525 Sorrento Valley Road, San Diego, California 92121 for Burbank Ski Company, 1855 Victory Place, Burbank, California 91504, effective April 2, 1975.

Approval No. 160.064/877/0, adult, Model No. CV-XL, vinyl dipped unicellular plastic foam "Water Ski Vest", manufactured in accordance with U.S.C.G. Specification Subpart 160.064 and UL/MD report file No. MQ 114, Type III PFD, manufactured by Cut 'N' Jump Ski Corporation, 11525 Sorrento Valley Road, San Diego, California 92121 for Burbank Ski Company, 1855 Victory Place, Burbank, California 91504, effective April 2, 1975.

TELEPHONE SYSTEMS, SOUND-POWERED

Approval No. 161.005/70/0, sound powered telephone, pedestal or bulkhead mounting, selective ringing, common talking, 17 stations, Types 178-B, 178-P, 178-H-B, 178-H-P, watertight, manufactured by Henschel Corporation, Amesbury, Massachusetts 01913, effective April 25, 1975.

Approval No. 161.005/71/0, sound powered telephone, console mounted, Types 17, 17-1R, 17-2RL, drip proof, manufactured by Henschel Corporation, Amesbury, Massachusetts 01913, effective April 25, 1975.

Approval No. 161.005/72/0, sound powered telephone, bulkhead mounted, Types 17, 17-1R, 17-2RL, 170, 170-1R, 170-2RL, drip proof, manufactured by Henschel Corporation, Amesbury, Massachusetts 01913, effective April 25, 1975.

CLASS A. EPIRB

Approval No. 161.011/5/0, Model ACR/RLB-10, Class A, float free, emergency position indicating radio beacon, FCC type accepted on March 19, 1975 under 47 CFR Part 83, manufactured by Chromalloy Electronics Division, 3901 North 29th Avenue, Hollywood, Florida 33020, effective April 7, 1975.

PRESSURE VACUUM RELIEF VALVES FOR TANK VESSELS

Approval No. 162.017/85/0, Figure No. 720 pressure vacuum relief valve, enclosed pattern, without pressure or vacuum unloader, weight loaded poppets, bronze parts except monel screen, 6" inlet, 6" outlet, dwg. No. C-3136 dated April 7, 1958, manufactured by Varec Division, Emerson Electric Company, 301 E. Alondra Boulevard, Gardena, California 90247, formerly Varec, Inc., effective April 11, 1975. (It is an extension of Approval No. 162.017/85/0 dated June 8, 1970 and change of address and name of manufacturer.)

Approval No. 162.017/86/0, Figure No. 720B pressure vacuum relief valve, enclosed pattern, with pressure but not vacuum unloader, weight loaded poppets, bronze parts except monel screen, 6" inlet, 6" outlet, dwg. No. C-3138 dated April 7, 1958, manufactured by Varec Division, Emerson Electric Company, 301 E. Alondra Boulevard, Gardena, California 90247, formerly Varec, Inc., effective April 11, 1975. (It is an extension of Approval No. 162.017/86/0 dated June 8, 1970 and change of address and name of manufacturer.)

Approval No. 162.017/96/0, 6" vacuum relief valve, Fig. 4100-07X, cast steel impact tested for —50° F. service with aluminum and stainless steel trim, for liquified inflammable gas and anhydrous ammonia at a minimum temperature of —50° F., manufactured by GPE Controls, Division of Vapor Corporation, 6511 Oakton Street, Morton Grove, Illinois 60053, effective April 2, 1975. (It supersedes Approval No. 162.017/96/0 dated January 9, 1969.)

Approval No. 162.017/99/1, OCECO Model V-130N pressure vacuum relief valve, flanged inlet, weight loaded discs, aluminum construction, dwg. F17310-A revised December 9, 1974, approved for 6", 8" and 10" sizes. Note: if aluminum valves are used with combustible or flammable or dangerous fluids, a cover of fire resistant material must be installed to protect these valves from fire, improved flame screen attachment and inclusion of 10" size valve, manufactured by The Johnston & Jennings Company, OCECO Division, 4700 W. Division Street, Chicago, Illinois 60651, effective April 4, 1975. (It supersedes Approval No. 162.017/99/1 dated January 20, 1975.)

Approval No. 162.017/105/0, Model 94030 6" Marine Breather Valve, dwg. No. 9403-00010, approved for pressure vacuum relief on cargo oil tanks with a maximum pressure setting of 2.5 p.s.i.g. and a maximum vacuum setting of 0.5 p.s.i.g., manufactured by GPE Controls, Division of Vapor Corporation, 6511 Oakton Street, Morton Grove, Illinois 60053, effective April 2, 1975. (It is an extension of Approval No. 162.017/105/0 dated May 16, 1969.)

SAFETY RELIEF VALVES, LIQUEFIED COMPRESSED GAS

Approval No. 162.018/47/2, 4" Style JQU safety relief valve for corrosive and liquefied compressed gas, dwg. No. D-41051, revised February 21, 1975, approved for maximum set pressure of 350 p.s.i., discharge capacity 15945 cubic feet per minute of air measured at 60° F., and 14.7 p.s.i.a., inlet flange O.D. changed from 10" to 9½" to accommodate use of emergency hood over valve in case of leakage of material through valve, manufactured by Crosby Valve and Gage Company, Wrentham, Massachusetts 02093, effective April 11, 1975. (It supersedes Approval No. 162.018/47/2 dated June 10, 1970 to show change in flange dimension.)

BACKFIRE FLAME CONTROL, GASOLINE ENGINES; FLAME ARRESTERS; FOR MERCHANT VESSELS AND MOTORBOATS

Approval No. 162.041/9/3, Barbron backfire flame arrester, Model 5724B; brass element, base, and cover, alternate material is aluminum (5724A), unit may have a fuel/fume feedback tube, alternate cover design may be low silhouette type, Opening in Base 2.68 inch, Element Height 2.00 inch, Base Corner Radius 0.75 inch, manufactured by Barbron Corporation, 14580 Lesure Avenue, Detroit, Michigan 48227, effective April 15, 1975. (It supersedes Approval No. 162.041/9/2 dated June 29, 1973.)

Approval No. 162.041/116/0, B175-55 flame arrester with B177-17A element assembly, testing waived because of similarity to B175-49 flame arrester, Approval No. 162.041/108/0, manufactured by Fuel Devices Division, Facet Enterprises, Inc., 696 Hart Avenue, Detroit, Michigan 48214, formerly Bendix Corporation, effective April 23, 1975. (It is an extension of Approval No. 162.041/116/0 dated April 15, 1970 and change of name of manufacturer.)

Approval No. 162.041/118/0, Bendix Model B175-48 backfire flame arrester with aluminum element strips, Part No. C177-14, replaces flame arrester Model No. B175-54, Approval No. 162.041/109/0, manufactured by Fuel Devices Division, Facet Enterprises, Inc., 696 Hart Avenue, Detroit, Michigan 48214, formerly Bendix Corporation, effective April 23, 1975. (It is an extension of Approval No. 162.041/118/0 dated May 6, 1970 and change of name of manufacturer.)

Approval No. 162.041/119/0, Bendix Model B175-46 backfire flame arrester with aluminum element strips, Part No. C177-16, replaces flame arrester Model No. B175-52, Approval No. 162.041/110/0, manufactured by Fuel Devices Division, Facet Enterprises, Inc., 696 Hart Avenue, Detroit, Michigan 48214, formerly Bendix Corporation, effective April 23, 1975. (It is an extension of Approval No. 162.-041/119/0 dated May 6, 1970 and change of name of manufacturer.)

Approval No. 162.041/120/0, Bendix Model B175-47 backfire flame arrester with aluminum element strips, Part No. C177-15, replaces flame arrester Model No. B175-53, Approval No. 162.041/111/0, manufactured by Fuel Devices Division, Facet Enterprises, Inc., 696 Hart Avenue, Detroit, Michigan 48214, formerly Bendix Corporation, effective April 23, 1975. (It is an extension of Approval No. 162.041/120/0 dated May 6, 1970 and change of name of manufacturer.)

Approval No. 162.041/121/0, Bendix Model B175-45 backfire flame arrester with aluminum element strips, Part No. C177-15, replaces flame arrester Model No. B175-51, Approval No. 162.041/112/0, manufactured by Fuel Devices Division, Facet Enterprises, Inc., 696 Hart Avenue, Detroit, Michigan 48214, formerly Bendix Corporation, effective April 23, 1975. (It is an extension of Approval No. 162.-041/121/0 dated May 6, 1970 and change of name of manufacturer.)

Approval No. 162.041/171/1, Barbron backfire flame arresters, Models 5714B and 57124B: brass element, base, and cover, alternate material is aluminum (5714A and 57124A), alternate cover design is low silhouette type, unit may have a fuel/fume feedback tube,

Model	Base opening (diameter in inches)	Element height (inches)	Base corner radius (inch)
5714B........	2.68	1.00	0.75
57124B........	2.68	1.25	.75

manufactured by Barbron Corporation, 14580 Lesure Avenue, Detroit, Michigan 48227, effective April 15, 1975. (It supersedes Approval No. 162.041/171/0 dated July 25, 1973.)

Approval No. 162.041/172/1, Barbron backfire flame arresters, Models 57154B and 57134B: brass element, base, and cover, alternate material is aluminum (57154A and 57134A), alternate cover design is low silhouette type, unit may have a fuel/fume feedback tube,

Model	Base opening (diameter in inches)	Element height (inches)	Base corner radius (inch)
57154B.......	2.68	1.50	0.75
57134B.......	2.68	1.375	.75

manufactured by Barbron Corporation, 14580 Lesure Avenue, Detroit, Michigan 48227, effective April 15, 1975. (It supersedes Approval No. 162.041/172/0 dated July 25, 1973.)

Approval No. 162.041/183/1, Barbron backfire flame arresters, Models 571317B and 571517B: brass element, base, and cover, alternate material is aluminum (571317A and 571517A), alternate cover is low silhouette design, may have a fuel/a fuel/fume feedback tube,

Model	Base opening (diameter in inches)	Element height (inches)	Base corner radius (inch)
571317B.......	3.06	1.375	0.75
571517B.......	3.06	1.50	.75

manufactured by Barbron Corporation, 14580 Lesure Avenue, Detroit, Michigan 48227, effective April 15, 1975. (It supersedes Approval No. 162.041/183/0 dated August 23, 1974.)

Approval No. 162.041/189/0, Volvo Penta flame arrester Model B-21M: aluminum body with brass element and four mounting holes for threaded fasteners, manufactured by Volvo Penta of America, Inc., P.O. Box 12758, Norfolk, Virginia 23502, effective April 16, 1975.

Bulkhead Panels for Merchant Vessels

Approval No. 164.008/68/0, Hopeman Brothers' "Beta 100" Building Unit, identical to that described in National Bureau of Standards Test Report No. FR 3863 dated January 10, 1974, and Hopeman Brothers' letters of April 4, 1975 and April 7, 1975 approved as meeting Class B-15 requirements, this product may not be used as a component in A-Class construction, plant located at Waynesboro, Virginia, manufactured by Hopeman Brothers, Inc., 156 East 46th Street, New York, New York 10017, effective April 18, 1975.

Approval No. 164.008/75/0, TAC Construction Materials, Ltd. bulkhead panel "LIMPET Marine Board" identical to that described in TAC's letter dated December 23, 1974; approved as meeting Class B-15 requirements in a density of 36b to 42 lbs./ft.^{3} in a $^3/_4$'' thickness, approved dwgs. SB221, SB222 and SB223 dated April 6, 1975 forms a part of this certificate. Plant: Trafford Park, Manchester, England, manufactured by TAC Construction Materials, Ltd., Building & Insulation Division, P.O. Box 22, Trafford Park, Manchester M17 1RU, England, effective April 7, 1975.

Incombustible Materials for Merchant Vessels

Approval No. 164.009/61/0, "Cafco Heat-Shield", sprayed asbestos fiber type incombustible material identical to that described in National Bureau of Standards Test Report No. TG10210-2053:FP-3550 dated March 10, 1960, approved in a density of not less than 9 pounds per cubic foot, manufactured by United States Mineral Products Company, Stanhope, New Jersey 07874, effective April 11, 1975. (It is an extension of Approval No. 164.009/61/0 dated June 2, 1970.)

Approval No. 164.009/62/0, "Cafco Blaze-Shield Type H", sprayed asbestos fiber type incombustible material identical to that described in National Bureau of Standards Test Report No. TG-10210-2053:FP3550 dated March 10, 1960, approved in a density of not less than 20 pounds per cubic foot, manufactured by United States Mineral Products Company, Stanhope, New Jersey 07874, effective April 11, 1975. (It is an extension of Approval No. 164.009/62/0 dated June 2, 1970.)

Approval No. 164.009/85/0, Foster "Insulfas Glass Cloth No. 30", glass cloth with Foster normalizing treatment, woven glass fabric type incombustible material identical to that referenced in National Bureau of Standards Report No. TG10210-2121:FR3652 dated August 23, 1965, manufactured by Foster Division, Amchem Products, Inc., Ambler, Pennsylvania 19002, effective April 11, 1975. (It is an extension of Approval No. 164.009/85/0 dated June 22, 1970.)

Approval No. 164.009/169/0, U.S. Gypsum's "Thermafiber Number 10 Granulated Wool" identical to that described in U.S. Gypsum's letter dated May 10, 1973, Plant locations: Wabash, Indiana; Torrance, California; Corsicana, Texas; South Plainfield, New Jersey; Tacoma, Washington, manufactured by United States Gypsum Company, 1000 East Northwest Highway, Des Plaines, Illinois 60016, effective April 16, 1975. (It supersedes Approval No. 164.009/169/0 dated June 1, 1973 to show new plant location.)

Dated June 12, 1975.

W. M. Benkert,
Rear Admiral, U.S. Coast Guard Chief, Office of Merchant Marine Safety.

[FR Doc.75-16518 Filed 6-24-75;8:45 am]

[CCD 75-136]

MARINE SANITATION DEVICES

Certification Granted

The purpose of this document is to notify interested persons that the Commandant, U.S. Coast Guard, has certified the design of certain marine sanitation devices in accordance with 33 CFR 159.12.

Equipment that is certified under 33 CFR 159.12 cannot be labelled under 33 CFR 159.16 as being certified. Because of this fact, purchasers of these devices are urged to request a copy of the Coast Guard letter granting certification of the device from the manufacturer or dealer. The "verification" column in the list below shows the data of the Coast Guard letter granting certification. A copy of the certification letter or this Notice should be retained by the owner as evidence that the device has been certified by the Coast Guard.

(33 U.S.C. 1322, 49 CFR 1.46 (l) and (m))

Dated: June 19, 1975.

W. M. Benkert,
Rear Admiral, U.S. Coast Guard, Chief, Office of Merchant Marine Safety.

[FR Doc.75-16519 Filed 6-24-75;8:45 am]

CIVIL AERONAUTICS BOARD

[Docket No. 27980]

FRONTIER AIRLINES, INC.

Notice of Application for Amendment of Certificate of Public Convenience and Necessity

JUNE 20, 1975.

Notice is hereby given that the Civil Aeronautics Board on June 20, 1975, received an application, Docket 27980, from Frontier Airlines, Inc. for amendment of its certificate of public convenience and necessity for route 73 to provide Wichita-Denver and Wichita-Little Rock nonstop service.

The applicant requests that its application be processed under the expedited procedures set forth in Subpart M of Part 302 (14 CFR Part 302).

[SEAL] EDWIN Z. HOLLAND,
Secretary.

[FR Doc.75-16563 Filed 6-24-75;8:45 am]

[Dockets 25280, 25513, 25661, 26494; Order 75-6-46]

INTERNATIONAL AIR TRANSPORT ASSOCIATION

Currency Matters

Correction

In FR Doc. 75-15489 appearing at page 25247 in the issue of Friday, June 13, 1975, in the third column, first paragraph, the seventeenth line now reading, "for refund, who not receive the $382" should read "for refund, would not receive the $382".

CIVIL SERVICE COMMISSION

DEPARTMENT OF THE TREASURY

Revocation of Authority To Make a Noncareer Executive Assignment; Correction

By notice of Monday, April 14, 1975, FR Doc. 75-9576, (40 FR 16712) the Civil Service Commission revoked the authority of the Department of the Treasury to fill by noncareer executive assignment in the excepted service the position of Chief Counsel, U.S. Customs Service, Legal Division. This is notice that this revocation should not have appeared in the FEDERAL REGISTER.

UNITED STATES CIVIL SERVICE COMMISSION,
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16455 Filed 6-24-75;8:45 am]

NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES

Grant of Authority To Make Noncareer Executive Assignment

Under authority of § 9.20 of Civil Service rule IX (5 CFR 9.20), the Civil Service Commission authorizes the National Foundation on the Arts and the Humanities to fill by noncareer executive assignment in the excepted service the position of Director of Public Programs, Division of Public Programs, National Endowment for the Humanities.

UNITED STATES CIVIL SERVICE COMMISSION.
[SEAL] JAMES C. SPRY,
Executive Assistant to the Commissioners.

[FR Doc.75-16456 Filed 6-24-75;8:45 am]

COMMITTEE FOR PURCHASE FROM THE BLIND AND OTHER SEVERELY HANDICAPPED

PROCUREMENT LIST 1975

Addition to Procurement List

Notice of proposed addition to Procurement List 1975, November 12, 1974 (39 FR 39964) was published in the FEDERAL REGISTER on March 7, 1975 (40 FR 10706).

Pursuant to the above notice the following commodity is added to the Procurement List, but for the period until August 1, 1976 procurement under Pub. L. 92-28 is limited to 550,000 MX.

CLASS 7510

		Price
Clip, Paper (RF), 7510-00-161-4292	MX	$1.27

By the Committee.

C. W. FLETCHER,
Executive Director.

[FR Doc.75-16757 Filed 6-24-75;11:22 am]

DEFENSE MANPOWER COMMISSION

MEETING

Pursuant to the provisions of the Federal Advisory Committee Act (Pub. L. 92-463), notice is hereby given that the Commissioners of the Defense Manpower Commission will meet on July 10, July 30 and July 31, 1975 at 1:30 p.m. in the General Services Administration Building, Room 2130, 18th and F Streets, NW., Washington, D.C. 20036. The purpose of these meetings will be to conduct an in-progress review of issues in the Development and Utilization Functional Area and such other business as may be presented by the members.

The Commissioners will meet on July 18 at 1:30 p.m. in the New Executive Office Building, Room 2010, 726 Jackson Place, NW., Washington, D.C. 20036. The purpose of this meeting will be to conduct an in-progress review of issues in the Compensation Functional Area and such other business as may be presented by the members.

The meetings will be open to the public. Because of limited space, interested persons wishing to attend should telephone (202) 254-7803 prior to each meeting.

Dated: June 18, 1975.

PAUL C. KEENAN, Jr.,
Deputy Executive Director.

[FR Doc.75-16520 Filed 6-24-75;8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

[FRL 389-5]

STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Delegation of Authority to State of Idaho

On December 23, 1971 (36 FR 24876) and March 8, 1974 (39 FR 9308), pursuant to section 111 of the Clean Air Act, as amended, the Administrator of the Environmental Protection Agency (EPA) promulgated regulations establishing standards of performance for five categories and seven categories of new stationary sources (NSPS), respectively. Section 111(c) of the Act directs the Administrator to delegate his authority to implement and enforce NSPS to any State which has submitted adequate procedures. Nevertheless, the Administrator retains concurrent authority to implement and enforce the standards following delegation of authority to the State.

On April 22, 1974 the Regional Administrator, Region X, EPA, forwarded to the State of Idaho information setting forth the requirements for an adequate procedure for implementing and enforcing the standards for NSPS. On January 24, 1975 the Governor of Idaho submitted to the EPA Regional Office a request for delegation of authority.

Included in that request were copies of the applicable State of Idaho Department of Health and Welfare regulations which specify the state-adopted standards of performance for new stationary sources and incorporate by reference the testing procedures set forth in 40 CFR Part 60. Also included was a letter from the Office of the Attorney General of the State of Idaho which cites the State statutes that provide the State with the requisite authority to enforce the NSPS. After a thorough review of that request, the Regional Administrator has determined that for the source categories set forth in the following official letter to the Governor, delegation is appropriate subject to the conditions set forth in paragraphs 1 through 15 of that letter:

Hon. CECIL D. ANDRUS,
Governor of Idaho,
Boise, Idaho 83701.

DEAR GOVERNOR ANDRUS: This letter is in response to your January 14, 1975 request for delegation of authority to implement and enforce the Standards of Performance for New Stationary Sources (NSPS) for eleven of the twelve source categories promulgated by EPA, pursuant to Section 111(b) of the Clean Air Act, 42 U.S.C. 1857c-6(b), as the date of your request.

The Environmental Protection Agency (EPA) has determined that the following statutes for the State of Idaho and the following regulations for the Department of Health and Welfare generally provide for an adequate and effective procedure for implementation and enforcement of the NSPS by the State of Idaho and the Department of Health and Welfare: Idaho Code, Title 39 in toto; Title 52-111; and Titles 18-5901 and 18-5903; Rules and Regulations for the Control of Air Pollution in Idaho, Regulations A and U. EPA hereby delegates to the State of Idaho on behalf of the Department of Health and Welfare, subject to the conditions set forth in paragraphs 1 through 15, the authority for all sources in the State included in the list of source categories noted below which are subject to the standards of performance for new stationary sources promulgated in 40 CRF Part 60 as of the date of the request. The ten (10) categories of sources are fossil fuel-fired steam generators; Portland cement plants; nitric acid plants; sulfuric acid plants, petroleum refineries, storage vessels for petroleum liquids, secondary lead smelters; secondary brass and bronze ingot production plants; iron and steel plants; and sewage treatment plants. Per your request, authority to implement and enforce NSPS for asphalt concrete plants is not covered by this delegation.

Delegation of authority to implement and enforce the NSPS for incinerators is not being granted at this time because the emission limitation contained in Regulation U, Section III. B.—Standards for New Incinerators (0.80 grains/dscf) is less stringent than that contained in 40 CFR 60.52 (0.08 grains/dscf). EPA cannot delegate authority for NSPS for incinerators to the State of Idaho until such time as the State adopts an emission limitation at least as stringent as that in 40 CFR Part 60. At that time, the State must submit a separate request for delegation of authority to the EPA.

This delegation, pursuant to Section 111 (c) of the Clean Air Act, 42 U.S.C. 1857c-6(c), is based on the following conditions:

1. Per your request, delegation is granted only for those sources which commence construction or modification after January 1, 1975.

2. Any source located in the State which is subject to NSPS is excluded from the provisions of Regulation A, Section 7, *Variances*, of the Rules and Regulations for the Control of Air Pollution in Idaho. However, in the future, if Idaho's regulations are amended to become more stringent than the federal regulations, the State may grant a variance from the more stringent State regulation so long as the subject source complies with the applicable federal regulation.

3. The performance tests referred to in Regulation U, Section II, B. shall be required for all sources subject to Regulation U, in accordance with the time limitations of Regulation A, Section 3.C.6.

4. Performance tests shall be conducted in accordance with the procedures set forth in Part 60 of Chapter I, Title 40, Code of Federal Regulations unless the Administrator of EPA or an appropriate EPA delegatee approves alternate methods or procedures.

5. Any determination made by the Director of the Department of Health and Welfare as outlined in Regulation U, Section II. A. 3. must be approved by the EPA.

6. Any sources constituting "stationary sources" under 40 CFR Part 60 which do not come within the purview of the regulations of the State of Idaho will be regulated by the EPA.

7. As previously discussed with the Idaho Department of Health and Welfare, should it be determined by the State and EPA that the proposed modification to The J. R. Simplot Company's #1 acid plant located near Pocatello, Idaho, constitutes a new source, the State of Idaho Department of Health and Welfare will assume the responsibility for enforcing the new source performance standards applicable to that acid plant.

8. As previously agreed between EPA and the Idaho Department of Health and Welfare, in order to satisfy the requirements of Section 114(c) of the Clean Air Act and 40 CFR 60.9, in any instance where the State is unable, under its own authority, to release emissions data to the public, the State shall so notify EPA so that EPA may take the action necessary to obtain and release the data.

9. Any actions of an enforcement nature, including requests for information and enforcement actions based thereon, which have been initiated by EPA prior to this delegation shall be completed by EPA.

10. Acceptance of this delegation of presently promulgated NSPS does not commit the State of Idaho and the Department of Health and Welfare to request or accept delegation of future standards and requirements. A new request for delegation will be required for any standards not included in this delegation of authority.

11. Enforcement of the NSPS in the State will be the primary responsibility of the Department of Health and Welfare. If the State determines that such enforcement is not feasible and so notifies EPA, or where the State acts in a manner inconsistent with the terms of this delegation, EPA may exercise its concurrent enforcement authority pursuant to Section 113 of the Clean Air Act, as amended, with respect to sources which are subject to the NSPS.

12. The Department of Health and Welfare and EPA will develop a system of communication sufficient to guarantee that each office is always fully informed and current regarding compliance status of the subject sources and interpretation of the regulations.

13. The delegation to the State of Idaho does not include the authority to implement and enforce NSPS for sources owned or operated by the United States which are located in the State.

14. If at any time there is a conflict between a State regulation and a federal regulation (40 CFR Part 60), the federal regulation must be applied if it is more stringent than that of the State. If the State is unwilling or unable to apply the more stringent federal regulation, EPA must be so notified by the State. The Regional Administrator will then modify or revoke the delegation as appropriate.

15. If the Regional Administrator determines that a State procedure for enforcing or implementing the NSPS is inadequate, or is not being effectively carried out, this delegation may be revoked in whole or part. Any such revocation shall be effective as of the date specified in a Notice of Revocation to the Governor of the State of Idaho.

A Notice announcing this delegation will be published in the FEDERAL REGISTER in the near future. The Notice will state, among other things, that, effective immediately, all reports required from sources located in the State pursuant to the federal NSPS for those categories of sources for which authority has been delegated to the State of Idaho should be submitted to the State of Idaho Department of Health and Welfare, Boise, Idaho, as well as the EPA Region X Office. However, reports required pursuant to 40 CFR 60.7(c) (excess emissions) will be submitted to the State Agency only. Any reports which have been or may be received in this office prior to the publication of the Notice will be forwarded to the Department of Health and Welfare.

Unless EPA receives from the State written notice of objections within 10 days of the date of receipt of this letter, the State will be deemed to have accepted all the terms of the delegation and the delegation will be effective immediately.

Sincerely yours,

CLIFFORD V. SMITH, Jr.,
Ph.D., P.E.,
Regional Administrator.

Therefore, pursuant to the authority delegated to him by the Administrator, the Regional Administrator notified the Governor of Idaho on June 9, 1975, that the authority to implement and enforce the standards of performance for new stationary sources was delegated to the State of Idaho.

Copies of the request for delegation of authority are available for public inspection at the Environmental Protection Agency, Region X Office, 1200 Sixth Avenue, Seattle, Washington 98101.

Effective immediately, all reports required pursuant to the standards of performance for new stationary sources for the source categories listed in the above letter should be submitted to the EPA Region X Office and should also be submitted to the State Agency at the following address:

Department of Health and Welfare
Statehouse
Boise, Idaho 83701

However, reports required pursuant to 40 CFR 60.7(c), (excess emissions) should be sent to the State Agency only.

This notice is issued under the authority of section 111 of the Clean Air Act, as amended (42 U.S.C. 1857c-6).

Dated: May 10, 1975.

C. V. SMITH, Jr.,
Regional Administrator,
Region X.

[FR Doc.75-16554 Filed 6-24-75;8:45 am]

[FRL 388-5; OPP-33000/268-269]

RECEIPT OF APPLICATIONS FOR PESTICIDE REGISTRATION

Data To Be Considered in Support of Applications

On November 19, 1973, the Environmental Protection Agency (EPA) published in the FEDERAL REGISTER (38 FR 31862) its interim policy with respect to the administration of section 3(c) (1) (D) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended. This policy provides that EPA will, upon receipt of every application for registration, publish in the FEDERAL REGISTER a notice containing the information shown below. The labeling furnished by the applicant will be available for examination at the Environmental Protection Agency, Room EB-31, East Tower, 401 M Street, SW, Washington, D.C. 20460.

On or before August 25, 1975, any person who (a) is or has been an applicant, (b) believes that data he developed and submitted to EPA on or after October 21, 1972, is being used to support an application described in this notice, (c) desires to assert a claim for compensation under section 3(c) (1) (D) for such use of his data, and (d) wishes to preserve his right to have the Administrator determine the amount of reasonable compensation to which he is entitled for such use of the data, must notify the Administrator and the applicant named in the notice in the FEDERAL REGISTER of his claim by certified mail. Notification to the Administrator should be addressed to the Information Coordination Section, Technical

Services Division (WH-569), Office of Pesticide Programs, 401 M Street, SW, Washington, D.C. 20460. Every such claimant must include, at a minimum, the information listed in the interim policy of November 19, 1973.

Applications submitted under 2(a) or 2(b) of the interim policy will be processed to completion in accordance with existing procedures. Applications submitted under 2(c) of the interim policy cannot be made final until the 60 day period has expired. If no claims are received within the 60 day period, the 2(c) application will be processed according to normal procedure. However, if claims are received within the 60 day period, the applicants against whom the claims are asserted will be advised of the alternatives available under the Act. No claims will be accepted for possible EPA adjudication which are received after August 25, 1975.

Dated: June 13, 1975.

JOHN B. RITCH, Jr.,
Director, Registration Division.

APPLICATIONS RECEIVED (OPP-33000/268)

EPA File Symbol 32427-EU. Allied Services, Div. of Allied Equities Corp., 765 Landess Ave., Milpitas CA 95035. ALTROL 23.8-B (L). Active Ingredients: Lithium salt of bromacil (5-bromo-3-sec-butyl-6-methyluracil) 23.8%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA Reg. No. 5481-161. Amvac Chemical Corp., 4100 E. Washington Blvd., Los Angeles CA 90023. DURAPHOS 10.3. Active Ingredients: Alpha Isomer of 2-Carbomethoxy-1-methylvinyl dimethyl phosphate 60%. Method of Support: Application proceeds under 2(c) of interim policy. PM16

EPA File Symbol 11623-I. Apollo Industries, Inc., 4480 Frederick Dr. SW, Atlanta GA 30336. APOLLO PERSONAL INSECT REPELLENT SPRAY. Active Ingredients: N,N-diethyl-m-toluamide 6.65%; Other isomers 0.35%; N-octyl bicycloheptene dicarboximide 2.00%; 2,3:4,5-Bis (2-butylene) tetrahydro-2-furaldehyde 0.50%; Di-n-propyl isocinchomeronate 0.50%; Petroleum Distillate 5.00%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 1022-UOL. Chapman Chemical Co., PO Box 9158, Mallory Station, Memphis TN 38109. PQ-52. Active Ingredients: Copper 8-Quinolinolate 2.50%; O-phenylphenol 6.00%. Method of Support: Application proceeds under 2(c) of interim policy. PM32

EPA File Symbol 34773-T. ChemTech Resources Inc., PO Box 24440, Dallas TX 75224. MWK-12 NON-SELECTIVE WEED KILLER. Active Ingredients: Monuron [3-(p-chlorophenyl)-N,1 dimethylurea] trichloacetate 12.00%. Method of Support: Application/proceeds under 2(c) of interim policy. PM25

EPA File Symbol 4715-GUI. Colorado International Corp., 5321 Dahlia St., Commerce City CO 80022. TRICHLORFON GRUB AND LICE CONTROL. Active Ingredients: Dimethyl (2,2,2-Trichloro-1-hydroxyethyl phosphonate) 8%. Method of Support: Application proceeds under 2(c) of interim policy. PM16

EPA File Symbol 10270-U. Contract Packaging Corp., 10 West End Rd., Totowa NJ 07512. LEMON DISINFECTANT CLEANER. Active Ingredients: n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chlorides 1.6%; n-Alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chlorides 1.6%; Sodium Carbonate 3.0%; Tetrasodium ethylenediamine tetraacetate 1.0%. Method of Support: Application proceeds under 2(b) of interim policy. Republished: Labeling claims changed. PM31

EPA File Symbol 2869-RA. Crystal Chemical Co., 101-02 37th Ave., Corona NY 11368. CRYSTAL ANT AND ROACH POWDER. Active Ingredients: Pyrethrins 0.40%; Piperonyl Butoxide, Technical 2.50%; Petroleum Distillate 3.60%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 677-GGN. Diamond Shamrock Corp., Agricultural Chemicals Div., 1100 Superior Ave., Cleveland OH 44114. CHLOROTHALONIL FLOWABLE 6. Active Ingredients: Chlorothalonil (tetrachloroisophthalonitrile) 54.0%. Method of Support: Application proceeds under 2(c) of interim policy. PM21

EPA File Symbol 13437—O. Du Cor Chemical Corp., PO Box 6086, Orlando FL 32809. DU COR AQUACIDE. Active Ingredients: Diquat dibromide (6,7-Dihydropyrido) (1,2-a:2:1'-C) pyrazidiinium dibromide 1.85%. Method of Support: Application proceeds under 2(c) of interim policy. PM24

EPA File Symbol 13437-RE. Du Cor Chemical Corp., PO Box 13298, Orlando FL 32809. DU COR FORMULA 72 WEED KILLER. Active Ingredients: Monuron Trichloroacetate (3-(p-chlorophenyl)-1, 1 dimethylurea trichloracetate) 3.19%; Aromatic Petroleum Derivative 91.67%. Method of Support: Application proceeds under 2(c) of interim policy. PM24

EPA File Symbol 6009-O. Eastern Color & Chemical Co., 35 Livingsten St., Providence RI 02940. EASTERN ECCOCIDE-CW-CONC. Active Ingredients: Copper-8-Quinolinolate 10.0%. Method of Support: Application proceeds under 2(c) of interim policy. PM22

EPA Reg. No. 1990-373. Farmland Industries, Inc., PO Box 7305, Kansas City MO 64116. CHEMSTOR. Active Ingredients: Organic Acids (19% Acetic Acid, 80% Propionic) 99%. Method of Support: Application proceeds under 2(b) of interim policy. Republished: Additional uses. PM21

EPA File Symbol 270-RRT. Farnam Companies, Inc., Box 21447, Phoenix AZ 85036. DAZZLE PLUS. Active Ingredients: Pyrethrins 0.09%; Piperonyl Butoxide Tech. 0.18%; N-octyl bicycloheptene dicarboximide 0.30%; 2,3:4,5-bis (2 butylene) tetrahydro-2-furaldehyde 0.50%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 10914-G. Feed Service, Inc., PO Box 482, Caldwell ID 83605. TELONE C SOIL FUNGICIDE AND NEMATICIDE. Active Ingredients: 1,3-Dichloropropene and related chlorinated aliphatics 85%; Chloropicrin (Trichloronitromethane 15%. Method of Support: Application proceeds under 2(c) of interim policy. PM21

EPA File Symbol 4584-OL. Gem, Inc., 1 Gem Blvd., Byhalia MS 38611. AEROCOS GERMICIDAL CLEANER. Active Ingredients: n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chlorides 1.6%; Sodium Carbonate 3.0%; Tetrasodium ethylenediamine tetraacetate 1.0%. Method of Support: Application proceeds under 2(b) of interim policy. PM31

EPA File Symbol 869-RLO. Green Light Co., PO Box 16192, San Antonio TX 78246. GREEN LIGHT 5% DIAZINON MANY PURPOSE DUST. Active Ingredients: O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate 5%. Method of Support: Application proceeds under 2(c) of interim policy. PM15

EPA File Symbol 14805-G. Hydrochem Continental Products of Texas, PO Box 3627, Odessa TX 79760. TOXSENE-41M. Active Ingredients: Disodium cyanodithioimidocarbonate 4.90%; Potassium N-methyldithiocarbamate 6.76%. Method of Support: Application proceeds under 2(b) of interim policy. PM33

EPA File Symbol 2342-OAI. Kerr-McGee Chemical Corp., Kerr-McGee Center, Oklahoma City OK 73125. GRAIN SORGHUM HARVEST AID LIQUID CONCENTRATE 3. Active Ingredients: Sodium chlorate 16.8%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA File Symbol 2342-OAO. Kerr-McGee Chemical Corp. GRAIN SORGHUM HARVEST AID LIQUID CONCENTRATE 5. Active Ingredients: Sodium chlorate 25.6%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA File Symbol 2342-OAT. Kerr-McGee Chemical Corp. GRAIN SORGHUM HARVEST AID LIQUID CONCENTRATE 6. Active Ingredients: Sodium chlorate 29.3%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA File Symbol 2342-OTN. Kerr-McGee Chemical Corp. GRAIN SORGHUM HARVEST AID LIQUID CONCENTRATE 4. Active Ingredients: Sodium chlorate 21.3%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA File Symbol 21326-G. Malone Chemical, Inc., 130 Marion St., Linden NJ 07036. MALONE NO. 76. Active Ingredients: n-Alkyl (60% C11, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chlorides 2.25%; n-Alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chlorides 2.25%; Tetrasodium ethylenediamine tetraacetate 1.00%; Sodium Carbonate 3.0%. Method of Support: Application proceeds under 2(b) of interim policy. PM31

EPA File Symbol 7001-EEI. Occidental Chemical Co., PO Box 198, Lathrop CA 95330. DBCP 15-E. Active Ingredients: 1,2-Dibromo-3-Chloropropane and related Halogenated C3 Aliphatics 93.7%. Method of Support: Application proceeds under 2(c) of interim policy. PM21

EPA File Symbol 1839-TG. Onyx Chemical Co., 190 Warren St., Jersey City NJ 07302. ALGAECIDE COMPOUND 103. Active Ingredients: n-Alkyl (C14 60%, C16 30%, C12 5%, C18 5%) Dimethyl Benzyl Ammonium Chlorides 2.8%; n-Alkyl (C12 50%, C14 30%, C16 17%, C18 3%) Dimethyl Ethylbenzyl Ammonium Chlorides 2.8%; n-Alkyl (98% C12, 2% C14) dimethyl 1-naphthylmethyl ammonium chlorides monohydrate 1.9%; n-Alkenyl (90% C18, 10% C16) dimethyl ethyl ammonium bromide 67.5%. Method of Support: Application proceeds under 2(c) of interim policy. PM31

EPA File Symbol 36476-E. Orcon, 5132 Venice Blvd., Los Angeles CA 90019. ORCON WOMP'EM. Active Ingredients: Boric Acid 98%. Method of Support: Application proceeds under 2(c) of interim policy. PM15

EPA File Symbol 3008-GI. Osmose Wood Preserving Co. of America, Inc., 980 Ellicott St., Buffalo NY 14209. Z WOOD PRESERVER 1 TO 4 CONCENTRATE. Active Ingredients: Bis(Tri-n-butyltin) oxide 1.5%. Method of Support: Application proceeds under 2(c) of interim policy. PM22

EPA File Symbol 10279-A. The Purdue Frederick Co., 50 Wash. St., Norwalk CT 06856. PRIODERM-L. Active Ingredients: Pyrethrins 0.165%; Piperonyl Butoxide, technical 2.000%; Petroleum distillate 5.000%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 10279-L. The Purdue Frederick Co. PRIODERM-50. Active Ingredients: Pyrethrins 0.165%; Piperonyl Butoxide, technical 2.000%; Petroleum distillate 5.000%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 10279-U. The Purdue Frederick Co. PRIODERM. Active Ingredients: Pyrethrins 0.333%; Piperonyl Butoxide, technical 4.000%; Petroleum distillate 5.333%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 29780-G. Ray-Chem Manufacturing Co., 187 Milton Ave., SE, Atlanta GA 30315. SANITIZER DISINFECTANT FORMULA 200. Active Ingredients: n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chlorides 5%; n-Alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chlorides 5%. Method of Support: Application proceeds under 2(b) of interim policy. PM31

EPA File Symbol 31606-A. Standard Sales Co., 278 Atlanta Ave., Brooklyn NY 11201. DUZ-IT ROACH AND ANT POWDER. Active Ingredients: Pyrethrins 0.9%; Petroleum Distillate 3.6%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 31606-L. Standard Sales Co., 278 Atlanta Ave., Brooklyn NY 11201. DUZ-IT ROACH POWDER. Active Ingredients: Sodium Fluoride 38.80%; Pyrethrins 00.35%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA File Symbol 557-ROEE. Swift Chemical Co., 111 W. Jackson Blvd., Chicago IL 60604. GOLDEN VIGORO WEED-N-FEED. Active Ingredients: Dimethylamine salt of 2-(2-methyl-4-chlorophenoxy) propionic acid 0.22%; Dimethylamine salt of 2,4-dichlorophenoxyacetic acid 0.48%; Dimethylamine salt of Dicamba (3,6-dichloro-o-anisic acid) 0.05%. Method of Support: Application proceeds under 2(c) of interim policy. PM23

EPA File Symbol 557-ROEG. Swift Chemical Co., 111 W. Jackson Blvd., Chicago IL 60604. GOLDEN VIGORO WEED & FEED 16-4-8. Active Ingredients: 2,4-dichlorophenoxyacetic acid 0.485%; 2-(2-Methyl-4-chlorophenoxy) propionic acid 0.204%; Dicamba (3,6-dichloro-o-anisic acid) 0.43%. Method of Support: Application proceeds under 2(c) of interim policy. PM23

EPA File Symbol 5769-RNH. Union Carbide Corp., Old Saw Mill Rd., Tarrytown NY 10591. DRYDEES DISPOSABLE DIAPER. Active Ingredients: n-Alkyl (60% C14, 30% C15, 5% C12, 5% C18) dimethyl benzyl ammonium chlorides 0.01095%; n-Alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chlorides 0.01095%. Method of Support: Application proceeds under 2(c) of interim policy. PM31

EPA File Symbol 7401-ETA. Voluntary Purchasing Groups, Inc., PO Box 460, Bonham TX 75418. HI-YIELD LIVESTOCK SPRAY NO. 2. Active Ingredients: Toxaphene (Technical Chlorinated Camphene containing 67-69% Chlorine) 43.2%; Malathion (0,0-dimethyl dithiophosphate of diethyl mercaptosuccinate) 4.3%; Petroleum Distillate 24.0%; Aromatic Petroleum Derivative Solvent 19.5%. Method of Support: Application proceeds under 2(c) of interim policy. PM16

EPA File Symbol 7401-ETI. Voluntary Purchasing Groups, Inc. FERTI-LIME ANT & ROACH SPRAY. Active Ingredients: 0,0-Diethyl 0-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate 0.500%; Pyrethrins 0.052%; Piperonyl Butoxide, Technical 0.261%; Petroleum Distillate 98.608%. Method of Support: Application proceeds under 2(c) of interim policy. PM15

EPA File Symbol 7401-ETT. Voluntary Purchasing Groups, Inc. FERTI-LIME WASP & HORNET KILLER. Active Ingredients: 0,0-Diethyl 0-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate 0.500%; Pyrethrins 0.052%; Piperonyl Butoxide, Technical 0.261%; Petroleum Distillate 98.608%. Method of Support: Application proceeds under 2(c) of interim policy. PM15

CORRECTED ITEMS

The following are corrections to the list of applications received previously published in the FEDERAL REGISTER.

EPA Reg. No. 4887-138. Stephenson Chem. Co., Inc., PO Box 188, College Park GA 30337. DURSBAN 2E INSECTICIDE. Active Ingredients: Chlorpyrifos [0,0-Diethyl 0-(3,5,6-trichloro-2 - pyridyl) phosphorothioate] 23.80%; Tetrachloroethylene 16.00%; Petroleum hydrocarbons 37.30%; Xylene 13.35% (originally published as 13.85%). Method of Support: Application proceeds under 2(c) of interim policy. PM12 (40 FR 23923)

EPA File Symbol 7969-UA. Basf Wyandotte Corp., 100 Cherry Hill Rd., Parsippany NJ 07054. BASALIN AN EMULSIFIABLE CONCENTRATE PREPLANT INCORPORATED HERBICIDE. Active Ingredients: Fluchoralin [N-(2-chloroethyl)-a,a,a-trifluoro-2,6-dinitro-N-propyl-p-toluidine] 45.1%. Method of Support: Application proceeds under 2(b) of interim policy. Originally published with incorrect file symbol. PM25 (40 FR 19677)

EPA File Symbol 257-GNR. Fuld-Stalfort, Inc., 1354 Old Post Rd., Havre de Grace MD 21078. FULD HOUSEHOLD INSECTICIDE PRESSURIZED SPRAY. Active Ingredients: d-trans Allethrin (allyl homolog of Cinerin I) 0.25%; Piperonyl butoxide, technical 0.80%; N-octyl bicycloheptene dicarboximide 0.40%; Petroleum distillate 8.05%. Method of Support. Application proceeds under 2(c) of interim policy. Originally published with incorrect file symbol. PM17 (40 FR 23790)

EPA File Symbol 1161O-1. Puma Chemical Co., 3012 S. Main, Fort Worth TX 76110. TERMICIDE 5-15. Active Ingredients: 2,4-Dichlorophenoxyacetic Acid Aklanolamine Salts (of the Ethanol and Isopropanol Series) 5.31%; Monosodium Acid Methanearsonate 8.86% (originally published as 8.65%). Methods of Support: Application proceeds under 2(c) of interim policy. PM23 (40 FR 24324).

EPA Reg. No. 1471-35. Elanco Products Co., Div. Eli Lilly & Co., PO Box 1750, Indianapolis IN 46206. ELANCO TREFLAN E.C. Active Ingredients: trifluralin (a,a,a-trifluoro-2,6-dinitro-N,N - dipropyl-p-toluidine) 44.5% (originally published as 4.5%). Method of Support: Application proceeds under 2(c) of interim policy. PM23 (40 FR 24234)

EPA File Symbol 150-UI. Anderson Chem. Co., Box 1041, Litchfield MN 55355 (originally published as Box 141). ADINE IODINE SANITIZER. Active Ingredients: Butoxy polypropoxy polyethoxy ethanol-iodine complex 12.47%; Polyethoxy polypropoxy polyethoxy ethanol-iodine complex (providing 1.6% titratable iodine) 0.37%. Method of Support: Application proceeds under 2(b) of interim policy. PM34 (40 FR 22169)

EPA File Symbol 2869-RU. Crystal Chem., Corp., 101-02 37th Ave., Corona NY 11368. PINE ODOR DISINFECTANT. Active Ingredients: Pine Oil 12%; Oleic Acid (#198) 8.8% (originally published as .8.3%); Caustic Potash—45% 2%; Ortho-benzyl-para-chlorophenol 3.5%; Isopropyl Alcohol 10%. Method of Support: Application proceeds under 2(c) of interim policy. PM32 (40 FR 22586)

EPA File Symbol 8612-IT. B & G Co., PO Box 20373, Dallas TX 75220. B & G SYN-PY-2. Active Ingredients: (5-Benzyl-3-furyl) methyl 2,2-dimethyl-3-(2-methylpropenyl) cyclopropanecarboxylate 2.000% (originally published as (5-Benzyl-3-furge . . .)); Related compounds 0.274%. Method of Support: Application proceeds under 2(c) of interim policy. PM17 (40 FR 22877)

EPA File Symbol 4450-GT. Chemex Chemicals and Coatings Co., Inc., PO Box 5072, Tampa FL 33605. CHEMEX FLYING INSECTICIDE SPRAY. Active Ingredients: Pyrethrins 0.30%; Piperonyl butoxide, technical 0.60%; N-octyl bicycloheptene dicarboximide 1.00%; Petroleum distillate 8.10% (originally published as 810%). Method of Support: Application proceeds under 2(c) of interim policy. PM17 (40 FR 22877)

EPA File Symbol 8469-RE. Coastal Ag-Chem., 1015 E. Wooley Rd., Oxnard CA 93030. CHLORDANE TERRACLOR CAPTAN 10-10-10 GRANULAR. Active Ingredients: Chlordane Tech. 10.0%; Pentachloronitrobenzene 10.0%; Captan N-((trichloromethyl)thio)-4-cyclohexene - 1,2-dicarboximide 10.0%. Method of Support: Application proceeds under 2(c) of interim policy. Originally published with incorrect file symbol. PM15 (40 FR 22301)

APPLICATIONS RECEIVED (OPP-33000/269)

EPA Reg. No. 464-3. The Dow Chem. Co., PO Box 1706, Midland MI 48640. DOW METHYL BROMIDE. Active Ingredients: Methyl Bromide 100%. Method of Support: Application proceeds under 2(c) of interim policy. PM11

EPA Reg. No. 246-236. The Dow Chem. Co., PO Box 1706, Midland MI 48640. VIKANE FUMIGANT. Active Ingredients: Sulfuryl 99%. Method of Support: Application proceeds under 2(c) of interim policy. Republished: Added uses. PM11

EPA File Symbol 13437-RG. Du Cor Chem. Corp., PO Box 6086, Orlando FL 32809. LO-TOX. Active Ingredients: Sodium Chlorate 11.0%; Sodium Metaborate 26.0%. Method of Support: Application proceeds under 2(c) of interim policy. PM25

EPA File Symbol 10107-ER. Harris Serum & Supply Co., Inc., PO Box 410, McCook NB 69001. CYTHION ULV CONCENTRATE. Active Ingredients: Malathion 95.0%. Method of Support: Application proceeds under 2(c) of interim policy. PM16

EPA Reg. No. 10182-7. ICI United States Inc., Agricultural Chem. Div., Concord Pike and New Murphy Rd., Wilmington DE 19897. PIRIMOR 50 WP INSECTICIDE. Active Ingredients: 2-(dimethylamino)-5,6-dimethyl-4-pyrimidinyl dimethylcarbamate 50%. Method of Support: Application proceeds under 2(b) of interim policy. Republished: Added claims. PM16

EPA File Symbol 3624-RAT. Nova Products, Inc., PO Box 5086, Kansas City KS 66119. NOVA ROACH AND ANT SPRAY. Active Ingredients: 0,0-Diethyl 0-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate 1.00%; Pyrethrins 0.15%; Technical Piperonyl Butoxide 0.375%; Petroleum Distillate 83.235%. Method of Support: Application proceeds under 2(c) of interim policy. PM15

EPA Reg. No. 7001-50. Occidental Chem. Co., PO Box 198, Lathrop CA 95330. MALAWET 25 W. Active Ingredients: Malathion 25%. Method of Support: Application proceeds under 2(c) of interim policy. Republished: Added Claims. PM16

EPA Reg. No. 7001-9. Occidental Chem. Co., PO Box 198, Lathrop CA 95330. CYTHION 5 EC (PREMIUM GRADE MALATHION). Active Ingredients: Malathion 56.4%; Xylene 35.5%. Method of Support: Application proceeds under 2(c) of interim policy. Republished: Added Claims. PM16

EPA File Symbol 33576-GU. Olin Water Services, Olin Corp., 120 Long Ridge Rd., Stamford CT 06904. OLIN 7061. Active Ingredients: Sodium dimethyl dithiocarbamate 16.0%; Nabam (Disodium ethylene bis-dithiocarbamate) 15.0%. Method of Support: Application proceeds under 2(c) of interim policy. PM33

EPA File Symbol 33576-GL. Olin Water Services, Olin Corp., 120 Long Ridge Rd., Stamford CT 06904. OLIN 7040. Active Ingredients: Tetrahydro-3,5, dimethyl-2H-1,-3,5, thiadiazine-2-thione 24%. Method of Support: Application proceeds under 2(c) of interim policy. PM33

EPA File Symbol 3462-0. Keith Sime, 4830 SW. Richardson Dr., Portland OR 97201. NCL LEAFEEDER DUST-B. Active Ingredients: Iso butyl Ester, of 2,4-Dichlorophenoxyacetic acid 1.23%. Method of Support: Application proceeds under 2(c) of interim policy. PM23

EPA Reg. No. 6720-8. Southern Creek Prod. Co., Inc., PO Box 109, Tampa FL 3310. SMCP MALATHION 57% PREMIUM GRADE. Active Ingredients: Malathion 0,0-dimethyl dithiophosphate of diethyl mercaptosuccinate) 57.0%; Xylene 34.9%. Method of Support: Application proceeds under 2(c) of interim policy. PM16

EPA File Symbol 7992-RT. TNT Chemicals, Inc., 7301 NW. 77th St., MIAMI FL 33166. TNT PROFESSIONAL STRENGTH FORMULA FLYING INSECT KILLER. Active Ingredients: (5-Benzyl-3-furyl) methyl 2,2-dimethyl-3-(2-methylpropenyl) cyclopropanecarboxylate 0.200%; Related Compounds 0.027%; d-trans Allethrin (allyl homolog of Cinerin I) 0.400%; Related compounds 0.030%; Aromatic petroleum hydrocarbons 0.265%; Petroleum distillate 6.500%. Method of Support: Application proceeds under 2(c) of interim policy. PM17

EPA Reg. No. 148-865. Thompson-Hayward Chem. Co., PO Box 2383, Kansas City KS 66110. DE-FEND E-267 DIMETHOATE SYSTEMIC INSECTICIDE. Active Ingredients: Dimethoate (0,0-dimethyl S-[N-methylcarbomoylmethyl] phosphorodithioate) 30.5%. Method of Support: Application proceeds under 2(c) of interim policy. Republished: Added claims. PM16

[FR Doc.75-16171 Filed 6-24-75;8:45 am]

FEDERAL COMMUNICATIONS COMMISSION

[Docket No. 20281; FCC 75-704]

INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION

Preparation of the 1975 Meeting of Governments on the Establishment of an International Maritime Satellite System

1. On December 5, 1974, the Commission released a Notice of Inquiry in this docket inviting comments from interested parties on a number of questions and issues related to the Intergovernmental Conference which was held from April 23 to May 9, 1975, in London, England, to consider the establishment of an international maritime satellite communication system.

2. The Commission received 10 comments[1] in response to its Notice of Inquiry. The Commission carefully reviewed these comments and took them into consideration in the recommendations which were forwarded to the Department of State concerning the position of the United States at the Conference.

3. The recently concluded session of the Conference discussed the basic issues relative to the establishment of an international maritime satellite system, but did not conclude its work. At the conclusion of the session, the Conference adopted a Sessional Act,[2] which, in addition to setting forth the background of the Conference, the participants and the issues discussed, delineated the understandings that were reached at this session and prescribed the future work of the Conference. The actions taken by the Conference were as follows:

(a) It was agreed that, "in order to improve maritime communications, there was a need for a worldwide maritime satellite system and also that there was a need for an International Inter-Governmental Organization to administer and manage this system." [INMARSAT]

(b) It agreed on the following principles:

(1) "that any entity which may be designated by a Member State to enjoy rights and fulfill obligations in the Organization . . . shall be designated by the Government of the Member State;

(2) that an entity so designated shall be subject to the jurisdiction of the designating Member State;

(3) that any entity so designated shall, to the satisfaction of the designating Member State, be competent and have the powers necessary to discharge the functions for which it will be responsible;

(4) that the rights, obligations and functions of any entity so designated shall be clearly defined; and

(5) that in the event of default or withdrawal of a designated entity the designating Member State shall assume the capacity of a designated entity, designate a new entity or withdraw.

(c) Adopted a Recommendation "on the Use of Ship-Earth Stations Operating in the Bands 1535-1542.5 and 1636.5-16644 MHz within Harbour Limits and Other Waters Under National Jurisdiction."[3]

(d) Agreed to reconvene in a second session of the Conference in London from February 9 to February 27, 1976.[4]

(e) Established an Inter-Sessional Working Group to prepare for the second session of the Conference, and specified the issues the Working Group should consider. The first meeting of the Working Group will take place from August 4 to August 8, 1975, in London.

4. At this stage of the international negotiations, the Commission wishes to focus attention on a single issue—namely the designation of a private commercial communication entity to be the U.S. participant and investor in any international maritime satellite organization that may be established. As indicated above, the Conference has agreed upon the need for an international Inter-Governmental Organization to administer and manage a world-wide maritime satellite system and has accepted, in principle, the concept that a member government will be able to designate an entity "to enjoy rights and fulfill obligations in the Organization." If the United States decides to join INMARSAT, it will designate a private entity to participate and to assume all financial obligations to the INMARSAT organization. We also believe it essential that the prospective designated entity be selected promptly so that other nations participating in the Conference will be apprised of its identity and be assured that it will be "competent and have the powers necessary to discharge the functions for which it will be responsible,"[5] and in order to permit the entity to play a meaningful role in the further negotiations looking toward the establishment of INMARSAT.

5. A threshold issue in the selection process is to determine which entities in the United States will commit themselves to participate and the extent of such commitment. Several of the carriers indicated in a general way, through responses to the Notice of Inquiry on this Docket, their willingness to be participants. However, for the reasons stated above, we believe it necessary to have a firm commitment from any interested party who wishes to participate, and particularly to indicate the extent to which it will be willing to make a financial investment in this new organization—INMARSAT. We recognize that, at this time, many uncertainties exist, both with respect to any such organization that may eventually be established and with respect to the entity which will be designated to participate in INMARSAT. Therefore, in order to assist parties who may be interested, we are setting forth certain preliminary assumptions and views which take into consideration, inter alia, the responses previously filed in this Docket.

6. First, with respect to INMARSAT, we assume that it will be operated on a commercial basis; that the designated entity will be solely liable for all financial commitments to INMARSAT; that the investors will have a voice in the conduct of INMARSAT commensurate with their investment; that initial investment shares will be negotiated at the Conference and be based on projected maritime satellite usage; and that continuing investment will be based on actual usage of the system after the system has been in world-wide operation for a specific number years.[6] It is antic-

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[1] Comments were received from American Institute of Merchant Shipping; American Radio Association, AFL-CIO, *et al.*; American Telephone and Telegraph Company; Communications Satellite Corporation; COMSAT General Corporation; Harris Corporation (R.F. Communications Division); ITT World Communications Inc.; RCA Global Communications, Inc.; TRT Telecommunications Corporation; and Western Union International, Inc.

[2] A copy of the Sessional Act was filed as part of the original document.

[3] Filed as part of the original document.

[4] Resolution to reconvene filed as part of original document.

[5] See Paragraph 21(c) of the Sessional Act.

[6] The *formula for* calculating usage for investment purposes will be the subject of further negotiations, and we assume the formula finally adopted will constitute an acceptable basis for U.S. participation.

ipated that the United States Government will issue appropriate instructions to the designated entity with respect to its participation in INMARSAT (similar to the procedures which have been followed in INTELSAT), and that the provision of maritime services to the public will be fully regulated by the Commission in accordance with applicable domestic laws.

7. Second, our preliminary views with respect to U.S. participation is that a single entity should be designated as the U.S. participant if the U.S. joins INMARSAT, regardless of the number of communications entities that may be authorized to provide maritime communications service to the public using the prospective INMARSAT satellite system. We are thus rejecting the suggestion that the U.S. seek to obtain authority in the INMARSAT arrangements to designate more than one communications entity to participate. We believe that all U.S. interests—public, private and political—will best be served by designating a single entity to represent U.S. interests in the planning, negotiation, and basic operation of any international maritime satellite communications system which may evolve. Furthermore, any attempt to designate more than one entity could seriously jeopardize our efforts to assure acceptance of our basic requirement that U.S. participation be via a designated private entity rather than a governmental entity.

8. It has also been suggested that one of the existing carriers be designated as the U.S. participant in INMARSAT. While we do not, at this time, rule out this possibility, we believe it may have serious drawbacks. We anticipate that maritime communications service in the U.S. will continue to be provided by several competing carriers. In such a competitive environment, it is questionable whether one of the competing carriers should be the U.S. designated entity in INMARSAT.

9. Another possibility is that the U.S. participant be an entity representing the carriers which provide maritime satellite communications service to the public. It has been suggested that such an entity could be either a consortium of the carriers or a separate corporation owned by them. While there are many similarities in these approaches, questions have been raised as to whether a consortium would be a suitable or adequate arrangement, particularly since a consortium is not an "entity" with legal personality. This could present significant problems with respect to participation in INMARSAT, e.g., signing an international agreement, providing assurance of financial responsibility and membership on the INMARSAT Council.

10. We anticipate that any designated entity would be primarily an interface between the carriers and INMARSAT; that it would provide representation on the Council on behalf of the carriers and pursuant to appropriate government instructions; that it would not itself be a carrier or a profit-making organization; that the space segment capacity it obtained would "flow through" to the carriers without additional charge; and that each carrier would individually furnish maritime communications service to the public pursuant to tariffs filed with the Commission.

11. The above assumptions and proposals are intended to stimulate the consideration of proposals as to the designation of the U.S. entity to participate in INMARSAT. Accordingly, we are inviting all interested parties to submit proposals concerning the U.S. designated entity and to address themselves and respond to the following issues and questions. In particular, we request that parties interested in financially investing in the proposed system provide specific and detailed plans and responses.

(a) If the designated entity is one of the existing carriers now authorized to provide maritime service, what should be the relationship between that entity and other carriers providing maritime service? Should that designated entity be solely a "carrier's carrier" or should it also be authorized to provide service to the public? What selection procedures should be followed if the Commission determines that one of the existing carriers should be the designated entity?

(b) Should the designated entity be a consortium or a new corporation? What are the advantages and disadvantages of each? Who should be eligible to participate in any consortium or new corporation? How should ownership be apportioned initially? On a long-term basis? What measures, if any, should be taken to preclude control of the consortium or corporation by one company? What should be the arrangements for managing the consortium or corporation? What procedures should be followed and conditions imposed to insure compliance with the antitrust laws, including competition in the procurement of apparatus, equipment and services?

(c) To what extent is your company prepared to make a firm financial commitment to invest in INMARSAT if the U.S. designated entity is (1) a separate corporation, (2) one of the existing maritime carriers, (3) a consortium, or (4) some other type of entity. What specific terms and conditions, if any, would your company place on making such a commitment? What should be the minimum financial commitment for participation? Provide information demonstrating the ability of your company to meet its financial commitment, both initially and on a continuing basis.

(d) Should maritime carriers not participating in the designated entity be permitted to furnish maritime satellite service to the public?

(e) Should the designated entity own and operate, in part or in whole, the earth stations in the United States? If not, who should own and operate such earth stations?

(f) What should be the relationship between the designated entity, the INMARSAT system, and terrestrial maritime communications systems?

12. In view of the importance of selecting the designated entity at the earliest possible date, it is necessary that interested parties file their responses to this Further Notice on or before July 14, 1975. In addition to the questions set forth above, parties may include in their responses any additional comments or recommendations which they believe may be helpful to the Commission in the process of selecting the designated entity. Responses should be filed pursuant to § 1.419(b) of the Commission's rules and regulations which requires, inter alia, an original and 14 copies of all filings. All relevant and timely comments will be considered by the Commission. The Commission may also take into account other pertinent information before it in addition to the responses to this Further Notice.

Adopted: June 11, 1975.

Released: June 17, 1975.

FEDERAL COMMUNICATIONS COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretray.

[FR Doc.75-16526 Filed 6-24-75;8:45 am]

[Docket No. 20452]

INTERCONNECTION FACILITIES PROVIDED TO THE INTERNATIONAL RECORD CARRIERS

Extension of Time for Comments

1. RCA Global Communications (RCA Globcom) has requested a fourteen day extension of the dates established for the filing of comments and replies in the above-captioned proceeding. Pursuant to the Commission's May 7, 1975 (40 F.R. 20853), Designation Order herein, FCC 75-451, comments are presently due on or before June 12, 1975 and replies on or before June 27, 1975. In support of its request RCA Globcom states that essentially the same staff assigned to this proceeding have also been involved in the intensive negotiations in Docket No. 20199 which have been taking place on an almost daily basis during the period May 14 to May 30. RCA Globcom states that because such negotiations have been so extremely time consuming there has not yet been sufficient time for RCA Globcom to give adequate consideration to the matters at issue herein. RCA Globcom states that such extension is required in order for it to sufficiently address the matters at issue herein which may have serious impact on the technical, operational and financial aspects of RCA Globcom's international telecommunications business. Finally, RCA Globcom states that counsel for AT&T, ITT Worldcom, and WUI either support or do not oppose the requested extension.

2. Upon consideration of the arguments made by RCA Globcom in support of its request for an extension of time we conclude that it has shown good cause for an extension of time. However, we do not believe the circumstances justify the full 14-day extension requested by

RCA Globcom. While the filing dates herein are based on the May 13, 1975 publication of the Commission's Designation Order in the FEDERAL REGISTER, such Designation Order was released by the Commission on May 7, 1975. Thus, as a practical matter, RCA Globcom has already had nearly an additional week's time in which to consider the matters set for inquiry by the Commission. Therefore, we believe only a 10-day extension is justified.

3. *Accordingly, it is ordered*, Pursuant to authority delegated under § 0.303(c) of the Commission's rules, that the date on which comments are due, originally scheduled for June 12, 1975, is extended to June 23, 1975 and the date for filing replies, originally scheduled for June 27, 1975, is extended to July 8, 1975.

Adopted: June 10, 1975.

[SEAL] WALTER R. HINCHMAN,
Chief,
Common Carrier Bureau.

[FR Doc.75-16528 Filed 6-24-75;8:45 am]

[Report No. 10812; Docket No. 19995; FCC 75-702]

SIMULTANEOUS NONDUPLICATION PROTECTION

Mountain Time Zone

JUNE 18, 1975.

The Federal Communications Commission has agreed to adopt network nonduplication rules for the Mountain Time Zone which are identical to those rules which are in effect throughout the rest of the country. This decision, in Docket 19995, followed the submission of voluminous documents and was taken following a special panel discussion before the Commission meeting en banc.

On April 11, 1975, the Commission requested representatives of Mountain Time Zone broadcast stations and cable television systems to participate in this special panel discussion in connection with its overall review of its network program nonduplication rules and policies. On April 3, 1975, the Commission made major changes in its nonduplication rules, but deferred action on the question of whether same-day network program nonduplication protection should be preserved in the Mountain Time Zone. (Only simultaneous protection is required on cable television systems operating in other time zones.) A separate proceeding was required for consideration of Mountain Time Zone issues because of the need for additional factual data.

The Commission decided to rescind its previous requirement that same-day nonduplication protection be afforded to smaller market television stations licensed to Mountain Time Zone communities and carried by local cable television systems which also carry more distant duplicating network stations. In its place, the Commission will require such cable systems to protect only simultaneously duplicating network programming. However, the Commission also indicated that it will consider petitions for special relief from Mountain Time Zone stations which can demonstrate a special need for additional network programming protection.

When these new rules are formally adopted in the forthcoming Second Report and Order in Docket 19995, the Commission will also provide for the preservation of the status quo for those stations now receiving same-day protection which indicate to the Commission that special relief from these new rules is required. The right to same-day protection on cable systems will be preserved while the Commission examines the merits of each case.

The Commission emphasized that these rule changes will not go into effect until 30 days after their publication in the FEDERAL REGISTER.

FEDERAL COMMUNCATIONS
COMMISSION,
[SEAL] VINCENT J. MULLINS,
Secretary.

[FR Doc.75-16527 Filed 6-24-75;8:45 am]

FEDERAL COUNCIL ON THE AGING

SENIOR SERVICES COMMITTEE

Meeting

The Federal Council on the Aging was established by the 1973 amendments to the Older Americans Act of 1965 (Pub. L. 93-29) for the purpose of advising the President, the Secretary of Health, Education, and Welfare, the Commissioner on Aging, and the Congress on matters relating to the special needs of older Americans.

Notice is hereby given pursuant to Pub. L. 92-463 that the Council's Senior Services Committee will meet on July 10, from 9:30 a.m. to 5 p.m. and on July 11, 1975 from 9 a.m. to 3 p.m. in Room 4563, Donohoe Building, 400 Sixth Street, SW., Washington, D.C. The agenda will consist of a review of the work plan of the Study on the Combined Interrelationships of Various Benefit Programs on Older Americans; and the development of recommendations for a national policy on services to the frail elderly.

This meeting is open for public observation.

Further information on the Council may be obtained from Cleonice Tavani, Executive Director, Federal Council on the Aging, Room 4022, Donohoe Building, 400 Sixth Street, SW., Washington, D.C. 20201, telephone: (202) 245-0441.

CLEONICE TAVANI,
Executive Director,
Federal Council on the Aging.

JUNE 18, 1975.

[FR Doc.75-16496 Filed 6-24-75;8:45 am]

FEDERAL DEPOSIT INSURANCE CORPORATION

QUARTERLY INDEX TO RECORDS

Determination and Order of Impracticability of Publication

Section 552(a)(2) of title 5, United States Code, as amended by the Act of November 21, 1974 (Pub. L. No. 93-502; 88 Stat. 1561), requires each agency of the Federal Government to "maintain and make available for public inspection and copying current indexes providing identifying information for the public as to any matter issued, adopted, or promulgated after July 4, 1967, and required by [section 552(a)(2)] to be made available or published." In addition, each agency must "promptly publish, quarterly or more frequently, and distribute (by sale or otherwise) copies of each index or supplements thereto unless it determines by order published in the FEDERAL REGISTER that the publication would be unnecessary and impracticable, in which case the agency shall nonetheless provide copies of such index on request at a cost not to exceed the direct cost of duplication."

Since July 4, 1967, the Corporation has maintained an index of matters required to be indexed by section 552(a)(2). The index has been available for public inspection and copying, pursuant to § 309.1(a)(3)(ii), of the Corporation's rules and regulations (12 CFR 309.1(a)(3)(ii)), at the Office of the Executive Secretary, Federal Deposit Insurance Corporation, 550 17th Street NW., Washington, D.C. 20429. To date, the Corporation has received only a minimal number of requests either for access to or copies of the index.

Moreover, few of the matters referenced in the index—such as routine final opinions and orders issued in connection with applications of insured State nonmember banks which involve the application of statutory factors to particular facts and circumstances generally unique to each individual bank—are of such precedential significance as to warrant the expense of publication of the index in relation to its value to the public.

The Board of Directors of the Federal Deposit Insurance Corporation has therefore determined and hereby orders that publication by the Corporation of the index pursuant to section 552(a)(2) is unnecessary and impracticable. Upon request, however, copies of the index or pertinent portions thereof will be provided at a cost not to exceed the direct cost of duplication.

By order of the Board of Directors, June 19, 1975.

FEDERAL DEPOSIT INSURANCE
CORPORATION,
[SEAL] ALAN R. MILLER,
Executive Secretary.

[FR Doc.75-16532 Filed 6-24-75; 8:45am]

FEDERAL RESERVE SYSTEM

FIRST NATIONAL AGENCY, INC.

Formation of Bank Holding Company

First National Agency, Inc., Wayne, Nebraska, has applied for the Board's approval under section 3(a)(1) of the Bank Holding Company Act (12 U.S.C. 1842(a)(1)) to become a bank holding company through acquisition of 88.66 percent of the voting shares of First National Bank of Wayne, Wayne, Nebraska. The factors that are considered in acting on the application are set forth in section 3(c) of the Act (12 U.S.C. 1842(c)).

First National Agency, Inc., Wayne, Nebraska has also applied, pursuant to section 4(c)(8) of the Bank Holding Company Act (12 U.S.C. 1843(c)(8)) and § 225.4(b)(2) of the Board's Regulation Y, for permission to retain voting shares of the general insurance agency business operated by First National Agency, Inc. on the premises of the First National Bank of Wayne, Wayne, Nebraska. Notice of the application was published on May 22, 1971, in The Wayne Herald, a newspaper circulated in Wayne, Nebraska.

Applicant states that the proposed subsidiary would continue to engage in the activities of a general insurance agency in a town with a population of less than 5,000. Insurance sales include medical and hospital, credit life, hail and crop, fire and casualty, liability and multiperil insurance, and surety bonds. Such activities have been specified by the Board in § 225.4(a) of Regulation Y as permissible for bank holding companies, subject to Board approval of individual proposals in accordance with the procedures of § 225.4(b).

Interested persons may express their views on the question whether consummation of the proposal can "reasonably be expected to produce benefits to the public, such as greater convenience, increased competition, or gains in efficiency, that outweigh possible adverse effects, such as undue concentration of resources, decreased or unfair competition, conflicts of interests, or unsound banking practices." Any request for a hearing on this question should be accompanied by a statement summarizing the evidence the person requesting the hearing proposes to submit or to elicit at the hearing and a statement of the reasons why this matter should not be resolved without a hearing.

The application may be inspected at the offices of the Board of Governors or at the Federal Reserve Bank of Kansas City.

Any views or requests for hearing should be submitted in writing and received by the Secretary, Board of Governors of the Federal Reserve System, Washington, D.C. 20551, not later than July 14, 1975.

Board of Governors of the Federal Reserve System, June 11, 1975.

[SEAL] ROBERT SMITH, III
Assistant Secretary of the Board.

[FR Doc.75-16452 Filed 6-24-75;8:45 am]

GENERAL ACCOUNTING OFFICE

REGULATORY REPORTS REVIEW

Receipt of Report Proposal

The following request for clearance of a report intended for use in collecting information from the public was received by the Regulatory Reports Review Staff, GAO, on June 18, 1975. See 44 U.S.C. 3512(c) and (d). The purpose of publishing this notice in the FEDERAL REGISTER is to inform the public of such receipt.

The notice includes the title of the request received; the name of the agency sponsoring the proposed collection of information; the agency form number, if applicable; and the frequency with which the information is proposed to be collected.

Written comments on the proposed FCC form are invited from all interested persons, organizations, public interest groups, and affected businesses. Because of the limited amount of time GAO has to review the proposed form, comments (in triplicate) must be received on or before July 14, 1975, and should be addressed to Mr. Carl F. Bogar, Assistant Director, Office of Special Programs, United States General Accounting Office, Room 5216, 425 I Street, NW., Washington, D.C. 20548.

Further information may be obtained from the Regulatory Reports Review Officer, 202-376-5425.

FEDERAL COMMUNICATIONS COMMISSION

Request for clearance of a new FCC Form 436, Application for a New or Modified Common Carrier Microwave Radio Station License, required to be filed when applying for a new or modified common carrier microwave radio station license. It is estimated that respondent burden would average fifteen minutes per response. The Federal Communications Commission anticipates that approximately 5,000 applications will be filed annually.

NORMAN F. HEYL,
Regulatory Reports
Review Officer.

[FR Doc.75-16577 Filed 6-24-75;8:45 am]

REGULATORY REPORTS REVIEW

Receipt and Approval of a Proposed Report

The following request for clearance of a proposed report intended for use in collecting information from the public was received by the Regulatory Reports Review Staff, GAO, on June 13, 1975. See 44 U.S.C. 3512 (c) and (d). The purpose of publishing this notice in the FEDERAL REGISTER is to inform the public of such receipt and the action taken by GAO.

FEDERAL POWER COMMISSION

Request was made for approval of FPC Form No. 69, "Alternative Fuel Demand Due to Natural Gas Curtailments". This form has been developed in cooperation with the Federal Energy Administration. FEA and FPC had reached an agreement whereby a common form would be developed and FPC would send the form to interstate pipeline companies and FEA would send it to all other suppliers of natural gas to end-users. FEA had stipulated, however, that if, due to administrative procedures, FPC's form was not ready to be mailed to respondents by a certain date, FEA would send the form to all suppliers of natural gas to end-use customers. FPC requested that GAO provide emergency clearance of the form to enable them to meet FEA's deadline. The information to be collected by this new form is necessary in order for the Commission and FEA to determine the extent to which alternate fuels may be utilized to meet the requirements of those end-use customers who will not be able to satisfy their energy needs with natural gas due to the imposition of increasing levels of curtailment upon such customers.

GAO has provided clearance of FPC's Form No. 69 under number B-180228 (R0206). This clearance expires June 30, 1978.

NORMAN F. HEYL,
Regulatory Reports
Review Officer.

[FR Doc.75-16578 Filed 6-24-75;8:45 am]

NATIONAL ENDOWMENT FOR THE ARTS AND THE HUMANITIES

RESEARCH PANEL

Meeting

JUNE 16, 1975.

Pursuant to the provisions of the Federal Advisory Committee Act (Pub. L. 92-463) notice is hereby given that a meeting of the Research Panel will meet at Washington, D.C. on July 21, 1975, from 9 a.m. to 5 p.m.

The purpose of the meeting is to review research grant applications submitted to the National Endowment for the Arts and the Humanities for possible grant funding.

Because the proposed meeting will consider financial information and personnel and similar files the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, pursuant to authority granted me by the Chairman's Delegation of Authority to Close Advisory Committee Meetings, dated August 13, 1973, I have determined that the meeting would fall within exemptions (4) and (6) of 5 U.S.C. 552(b) and that it is essential to close the meeting to protect the free exchange of internal views and to avoid interference with operation of the Committee.

It is suggested that those desiring more specific information contact the Advisory Committee Management Officer, Mr. John W. Jordan, 806 15th Street, NW., Washington, D.C. 20506, or call area code 202 382-2031.

JOHN W. JORDAN,
Advisory Committee
Management Officer.

[FR Doc.75-16510 Filed 6-24-75;8:45 am]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-254 and 50-265]

COMMONWEALTH EDISON CO. AND IOWA-ILLINOIS GAS AND ELECTRIC CO.

Issuance of Amendments to Facility Operating Licenses

Notice is hereby given that the U.S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 14 and 10 to Facility Operating License Nos. DPR-29 and DPR-30 (respectively) issued to the Commonwealth Edison Company (acting for itself and on behalf of the Iowa-Illinois Gas and Electric Company) which revised Technical Specifications for operation of the Quad Cities Units 1 and 2 located in Rock Island County, Illinois. These amendments are effective as of their date of issuance.

The amendments incorporate provisions in the Technical Specifications to require operability and surveillance of hydraulic snubbers required to protect the primary coolant system and all other safety related systems and components, in accordance with the licensee's request dated December 11, 1974.

The application for these amendments dated December 11, 1974, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of these amendments is not required since these amendments do not involve a significant hazards consideration.

For further details with respect to this action, see (1) the application for these amendments dated December 11, 1974, (2) Amendment Nos. 14 and 10 to License Nos. DPR-29 and DPR-30, with Change No. 25, and (3) the Commission's concurrently issued related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, NW., Washington, D.C., and at the Moline Public Library, at 504 17th Street in Moline, Illinois 60265. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Reactor Licensing.

Dated at Bethesda, Maryland, this 17th day of June, 1975.

For the Nuclear Regulatory Commission.

DENNIS L. ZIEMANN,
Chief, Operating Reactors Branch No. 2, Division of Reactor Licensing.

[FR Doc. 75-16550 Filed 6-24-75;8:45am]

[Docket No. 70-1113]

GENERAL ELECTRIC CO. URANIUM OXIDE FABRICATION FACILITY

Renewal of Special Nuclear Materials License

The Nuclear Regulatory Commission (the Commission) has considered the renewal of Special Nuclear Materials License No. SNM-1097 for the General Electric Company's UO_2 Fabrication Facility located in New Hanover County six miles north of the city of Wilmington, North Carolina. This license authorizes the use of special nuclear material in the fabrication of uranium dioxide fuel to be used in commercial light water reactors.

The U.S. Nuclear Regulatory Commission, Division of Materials and Fuel Cycle Facility Licensing, has prepared an environmental impact appraisal for the proposed renewal of SNM-1097 for the Uranium Oxide Fabrication Facility. On the basis of this appraisal, the Commission has concluded that an environmental impact statement for this particular action is not warranted because there will be no significant environmental impact attributable to the proposed action. The environmental impact appraisal is available for public inspection at the Commission's Public Document Room at 1717 H Street, N.W., Washington, D.C.

Dated at Bethesda, Maryland, this 19th day of June, 1975.

For the Nuclear Regulatory Commission.

RICHARD B. CHITWOOD,
Chief, Fuel Cycle Environmental Projects Branch, Division of Materials and Fuel Cycle Facility Licensing.

[FR Doc.75-16551 Filed 6-24-75;8:45 am]

REGULATORY GUIDE

Issuance and Availability

The Nuclear Regulatory Commission has issued a new guide in its Regulatory Guide Series. This series has been developed to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations and, in some cases, to delineate techniques used by the staff in evaluating specific problems or postulated accidents and to provide guidance to applicants concerning certain of the information needed by the staff in its review of applications for permits and licenses.

Regulatory Guide 3.30, "Selection, Application, and Inspection of Protective Coatings (Paints) for Fuel Reprocessing Plants," describes practices acceptable to the NRC staff for the selection, application, and inspection of protective coatings for fuel reprocessing plants. This guide endorses ANSI N512-1974, "Protective Coatings (Paints) for the Nuclear Industry."

Comments and suggestions in connection with (1) items for inclusion in guides currently being developed (listed below) or (2) improvements in all published guides are encouraged at any time. Public comments on Regulatory Guide 3.30 will, however, be particularly useful in evaluating the need for an early revision if received by August 22, 1975.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Section.

Regulatory Guides are available for inspection at the Commission's Public Document Room, 1717 H Street NW., Washington, D.C. Requests for single copies of issued guides (which may be reproduced) or for placement on an automatic distribution list for single copies of future guides should be made in writing to the Director, Office of Standards Development, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Telephone requests cannot be accommodated. Regulatory Guides are not copyrighted and Commission approval is not required to reproduce them.

Other Division 3 Regulatory Guides currently being developed include the following:

Control of Stainless Steel Welding for Safety-Related Components of Fuel Reprocessing Plants
Corrosion Testing and Evaluation of Metals for Application in Fuel Reprocessing Plants
Nondestructive Examination of Tubular Products for Use in Fuel Reprocessing and Fuel Fabrication Plants
Control of the Use of Sensitized Stainless Steel for Components of Fuel Reprocessing Plants
General Design Guide for Process Building Ventilation Systems for Fuel Reprecessing plants
General Fire Protection Guide for Fuel Reprocessing plants
Standard Format and Content of License Applications for Plutonium Processing and Fuel Fabrication Plants
Standard Format and Content of License Applications for Commercial Waste Burial Facilities
Quality Assurance for the Design, Construction, and Operation of Fuel Reprocessing Plants
Guide for Design, Construction, and Operation of Ventilation Systems for Plutonium Fuel Manufacturing Plants
Criteria for Siting, Design, and Operation of Plants for the Manufacture of Mixed Oxide Fuels
Guide to the Preparation of Emergency Plans for Uranium and Plutonium Processing and Fuel Fabrication Plants
Design Criteria for Spent Fuel Storage Facilities at HTGR Sites
Guide for Design of Irradiated Fuel Receiving and Storage Facilities
Assumptions Used for Evaluating the Consequences of a Criticality Accident in LWR Fuel Fabrication Plants
Selection, Training, and Qualification of Personnel for Fuel Reprocessing Plants
Temporary Storage of High-Level Liquid Waste at Fuel Reprocessing Plants
Assumptions Used for Evaluating the Consequences of a Criticality Accident in Fuel Reprocessing Plants
Assumptions Used for Evaluating the Consequences of a Criticality Accident in Plutonium Processing and Fuel Fabrication Plants
Confinement Structures and Systems for Plutonium Processing and Fuel Fabrication Plants
Emergency Water Systems for Fuel Reprocessing Plants and Plutonium Processing and Fuel Fabrication Plants
Protection Systems for Fuel Reprocessing Plants and for Plutonium Processing and Fuel Fabrication Plants
Design Basis Floods for Fuel Reprocessing Plants
Criteria for Gaseous Radioactive Effluent Systems at Fuel Reprocessing Plants
Design Criteria for Decommissioning of Nuclear Fuel Reprocessing Plants
Definition of Radioactive Waste Categories
Codes Applicable to Quality Control and Fabrication of Metallic Structures, Systems, and Components for Fuel Reprocessing Plants
Administrative Controls for Nuclear Fuel Reprocessing Plants
Administrative Controls for Nuclear Fuel Reprocessing Plants

(5 U.S.C. 552(a))

Dated at Rockville, Maryland this 18th day of June 1975.

For the Nuclear Regulatory Commission.

ROBERT B. MINOGUE,
Acting Director,
Office of Standards Development.

[FR Doc.75-16552 Filed 6-24-75;8:45 am]

OFFICE OF MANAGEMENT AND BUDGET

CLEARANCE OF REPORTS

List of Requests

The following is a list of requests for clearance of reports intended for use in collecting information from the public received by the Office of Management and Budget on June 19, 1975 (44 U.S.C. 3509). The purpose of publishing this list in the FEDERAL REGISTER is to inform the public.

The list includes the title of each request received; the name of the agency sponsoring the proposed collection of information; the agency form number(s), if applicable; the frequency with which the information is proposed to be collected; the name of the reviewer or reviewing division within OMB, and an indication of who will be the respondents to the proposed collection.

Requests for extension which appear to raise no significant issues are to be approved after brief notice through this release.

Further information about the items on this daily list may be obtained from the Clearance Office, Office of Management and Budget, Washington, D.C. 20503 (202-395-4529), or from the reviewer listed.

NEW FORMS

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration, Prospectus for Highway Safety Management Program Study, single time, State and local highway agencies and safety offices, Economics and General Government Division, 395-3451.

DEPARTMENT OF AGRICULTURE

Economic Research Service, Truck Broker Survey (Interview Schedule), Form ——, single time, exempt truck brokers, A. Strasser, 395-5867.

REVISIONS

DEPARTMENT OF AGRICULTURE

Food and Nutrition Service:
  Regulations for the National School Lunch Program, on occasion, State agencies and school food authorities, Lowry, R. L., 395-3772.
  School Breakfast & Nonfood Assistance Programs Regulations, on occasion, State agencies and school food authorities, Lowry, R. L., 395-3772.

DEPARTMENT OF LABOR

Manpower Administration:
  Part C, Handbook on Adjustment Assistance for Workers Under the Trade Act of 1974, ES-920, on occasion, TRA claimants, Caywood, D. P., 395-3443.
  Employer Order Form (for Placement Procedures), MA 7-45, on occasion, employers using USES services, Strasser, A., 395-5867.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration, Procedures for Non-Federal Navigation Facilities (Reporting and Record-Keeping Requirements), on occasion, owners of navigation aids, Caywood, D. P., 395-3443.

PHILLIP D. LARSEN,
Budget and Management Officer.

[FR Doc.75-16618 Filed 6-24-75;8:45 am]

CLEARANCE OF REPORTS

List of Requests

The following is a list of requests for clearance of reports intended for use in collecting information from the public received by the Office of Management and Budget on June 20, 1975 (44 U.S.C. 3509). The purpose of publishing this list in the FEDERAL REGISTER is to inform the public.

The list includes the title of each request received; the name of the agency sponsoring the proposed collection of information; the agency form number(s), if applicable; the frequency with which the information is proposed to be collected; the name of the reviewer or reviewing division within OMB, and an indication of who will be the respondents to the proposed collection.

Requests for extension which appear to raise no significant issues are to be approved after brief notice through this release.

Further information about the items on this daily list may be obtained from the Clearance Office, Office of Management and Budget, Washington, D.C. 20503 (202-395-4529), or from the reviewer listed.

NEW FORMS

TENNESSEE VALLEY AUTHORITY

Application of Electrical Energy to Nontraditional Uses, TVA 6261, monthly, distributors of Tennessee Valley Authority power to retail customers, Peterson, M. O., 395-5630.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education, Teachers and Participants Questionnaires (Students Criterion Referenced Tests), OE-419, OE-420, OE-421, OE-422, single-time, elementary and junior high school teachers in the project, Planchon, P., 395-6140.

DEPARTMENT OF LABOR

Bureau of Labor Statistics, Survey of Hours and Earnings of Selected Workers in Selected Industries, BLS 3010E, single-time, nonfarm business establishments, Strasser, A., 395-5867.

REVISIONS

DEPARTMENT OF AGRICULTURE

Agricultural Marketing Service, Application for Inspection Under the Agricultural Marketing Act of 1946, GR-201, on occasion, rice mills, Marsha Traynham, 395-4529.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education, Foreign Language Fellowships Application Packet and Related Forms—NDEA Title VI, OE7608, annually, individuals, Lowry, R. L., 395-3772.

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration, Motor Vehicle Diagnostic Inspection Demonstration Projects, semiannually, commercial motor vehicle repair facilities, Strasser, A., 395-5867.

EXTENSIONS

DEPARTMENT OF AGRICULTURE

Statistical Reporting Service, Wool Sales and Price Inquiry—New England, Louisiana and Idaho, annually, wool co-ops, pools, and buyers, Marsha Traynham, 395-4529.

DEPARTMENT OF COMMERCE

Bureau of East-West Trade, Service Supply SL License Procedure, IA 543, on occasion, U.S. Commercial exporters and foreign end users, Marsha Traynham, 395-4529.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Social Security Administration:
  Billing Forms Transmittal (Hospital and Medical Insurance Benefits, SSA-1609, on occasion, hospitals, home health agencies, Marsha Traynham, 395-4529.
Group Practice Plan Utilization Listing of Social Security Medical Insurance Services, SSA-1590, monthly, group practice prepayment plans, Caywood, D. P., 395-3443.
Office of Education:
  Preapplication for Federal Assistance (Construction Programs)—Non-Commercial Educational Broadcasting Facilities, etc., OE-323, annually, educational broadcasting station licensees, Lowry, R. L., 395-3772.
Instructions for Performance Report for the Part B, EHA & PL, 89-313, ESEA Program (as Amended), OE-9039-2, annually, state agencies, Lowry, R. L., 395-3772.

PHILLIP D. LARSEN,
Budget and Management Officer.

[FR Doc.75-16673 Filed 6-24-75;8:45 am]

SECURITIES AND EXCHANGE COMMISSION

[812-3821]

SCHRODER NAESS & THOMAS

Filing of Application for Exemption and Order of Temporary Exemption Pending Determination of the Application

Notice is hereby given that Schroder Naess & Thomas ("Naess"), 61 Broadway, New York, New York, had filed an aplication pursuant to section 9(c) of the Investment Company Act of 1940 ("the Act") for an order exempting Naess and any company of which it is presently an affiliated person, from the provisions of section 9(a) of the Act and, without prejudice to the Commission's consideration of such application, for an order of temporary exemption from section 9(a) pending the Commission's determination of the application for permanent exemption. All interested persons are referred to the application on file with the Commission for a statement of the representations made therein which are summarized below.

Naess states that it is a division of Schroders Incorporated, and is an investment advisor registered with the Commission. Naess serves as an investment advisor to Naess & Thomas Special Fund ("Fund") and the Cheapside Dollar Fund Limited ("Cheapside"), both of which are open end investment companies registered under the Investment Company Act of 1940 ("the Act").

On September 13, 1973 the Securities and Exchange Commission commenced an action pursuant to section 21(e) of the Exchange Act against 29 individual and corporate defendants, including Naess and the Fund, to enjoin violations of section 10(b) of the Exchange Act and Rule 10b-5 thereunder in connection with the purchases of the common stock of Bio-Medical Sciences, Inc. On June 17, 1975 a Stipulation of Settlement was entered into between the plaintiff, Securities and Exchange Commission, and Naess and the Fund and thereafter on June 18, 1975 a Final Judgment of Permanent Injunction by Consent and Order of Disgorgement and Restitution (the "Judgment") was entered in the action permanently enjoining Naess and the Fund from using material non-public corporate information in connection with the purchase or sale of any securities of Bio-Medical Sciences, Inc. in violation of section 10(b) and Rule 10b-5 and ordering the payment of the sum of $3,900 plus interest to certain parties, representing disgorgement of profits realized in connection with the purchase and sale of securities of Bio-Medical Sciences, Inc.

Section 9(a)(2) of the Act, as here pertinent, makes it unlawful for any person who, by reason of any misconduct, is permanently or temporarily enjoined by order, judgment, or decree of any court of competent jurisdiction from engaging in or continuing any conduct or practice in connection with the purchase or sale of any security to serve or act in the capacity of employee, officer, director, member of advisory board, investment adviser or depositor of any registered investment company or principal underwriter for any registered open-end company, registered unit investment trust, or registered face amount certificate company. Section 9(a)(3) makes it unlawful for a company, any affiliated person of which is ineligible by reason of section 9(a)(2), to serve or act in the enumerated capacities.

Section 9(c) provides that upon application the Commission by order shall grant an exemption from the provisions of section 9(a) either unconditionally or on an appropriate temporary or other conditional basis, if it is established that the prohibitions of section 9(a), as applied to Naess and the Fund are unduly or disproportionately severe or that the conduct of such person has been such as not to make it against the public interest or protection of investors to grant such application.

Naess submits pursuant to section 9(c) that the prohibitions of section 9(a) of the Act, to the extent applicable by virthe of the entry of the Final Judgment of Permanent Injunction by Consent and Order of Disgorgement and Restitution would be unduly and disproportionately severe as applied to Naess and that the conduct of Naess has been such as not to make it against the public interest or the protection of investors for the Commission to grant a permanent exemption from the provisions of section 9(a) of the Act. In support thereof Naess states:

(1) The prohibition of section 9(a) would deprive the Fund and Cheapside and their approximately 683 shareholders of the services of their respective investment advisors.

(2) The activities of Naess with regard to the sale of Bio-Medical Sciences, Inc., were for the benefit of the Fund and not for the direct pecuniary benefit of Naess and there was no intent to violate the law.

(3) In compliance with the terms of the Judgment entered against Naess and the Fund in this action, Naess has distributed to its security analysts, portfolio managers and any other personnel exercising investment discretion a formal written statement of policy with respect to the receipt and use of material non-public information and has undertaken to implement and supervise its employees' compliance with this policy.

(4) The employees of Naess who caused the Fund to purchase the stock of Bio-Medical Sciences, Inc. while allegedly in possession of material non-public information are no longer in the employ of Naess.

(5) Naess has never before been required to apply for an exemption from the provisions of section 9(a) of the Act.

(6) The application of the law regarding the nature and prescribed uses of material inside information is complex and uncertain.

The Commission has considered the matter and finds that:

(1) the prohibitions of section 9(a) might be unduly or disproportionately severe as applied to Naess in that the conduct of Naess has been such as not to make it against the public interest or protection of investors to grant the application for a temporary exemption from section 9(a) pending determination of the application, and

(2) in order to maintain the uninterrupted management of investment companies under the management of Naess it is necessary and appropriate in the public interest and consistent with the protection of investors and the purposes fairly intended by the policy and provisions of the Act that the temporary order be issued forthwith.

Accordingly, it is ordered, Pursuant to section 9(c) of the Act that Naess and any company of which it is presently an affiliated person be and they are hereby temporarily exempted from the provisions of section 9(a) of the Act, operative as a result of the entry of the injunction against Naess and the Fund in "Securities and Exchange Commission v. F. L. Salomon & Co., et al.", pending determination by the Commission of Naess's application for an order unconditionally exempting it and any company of which it is presently an affiliated person from the provisions of section 9(a) operative as a result of the entry of such injunction.

Notice is further given that any interested person may, not later than July 11, 1975, at 5:30 p.m. submit to the Commission in writing a request for a hearing on the matter accompanied by a statement as to the nature of his interest, the reason for such request, and the issues of fact or law proposed to be controverted, or he may request that he be notified if the Commission shall order a hearing thereon. Any such communication should be addressed: Secretary, Securities and Exchange Commission, Washington, D.C. 20549. A copy of such request shall be served personally or by mail (air mail if the person being served is located more than 500 miles from the point of mailing) upon Naess, care of Messrs. Jacobs Persinger & Parker, Russell P. Duncan, Esq., 70 Pine Street, New York, New York 10005. Proof of such service (by affidavit or in the case of an attorney-at-law by certificate) shall be filed contemporaneously with the request. At any time after said date, as provided in Rule 0-5 of the rules and regulations promulgated under the Act, an order disposing of the Application herein may be issued by the Commission upon the basis of the information stated in said application, unless an order for hearing upon said application shall be issued upon request or upon the Commission's own motion. Persons who request a hearing or advice as to whether a hearing is ordered will receive notice of further development in this matter, including the date of the hearing (if ordered) and any postponements thereof.

By the Commission.

[SEAL] SHIRLEY E. HOLLIS,
Assistant Secretary.

[FR Doc.75-16491 Filed 6-24-75;8:45 am]

SMALL BUSINESS ADMINISTRATION

[Proposed License No. 06/06-0178]

TAX-INVESTMENTS CONCEPTS, INC.

Application for a License To Operate as a Small Business Investment Company

Notice is hereby given that an application has been filed with the Small Business Administration (SBA) pursuant to § 107.102 of the regulations governing small business investment companies (13 CFR 107.102 (1975)), under the name Tax-Investments Concepts, Inc., 2200 Classen Boulevard, Suite 550 Citizens Tower, Oklahoma City, Oklahoma 73106, for a license to operate as a small business investment company under the provisions of the Small Business Investment Act of 1958, as amended (the Act) and the rules and regulations promulgated thereunder.

The proposed officers and directors are as follows:

William T. Daniel, 3112 Astoria, Oklahoma City, Okla. 73122, President, Director.

Grant E. Hegranes, 410 Northwest 20, Oklahoma City, Okla., Senior V.P., Director.

William Gregory Cunningham, 2744 Plymouth Lane, Oklahoma City, Okla. 73120, Vice President.

Billy Eugene Haney, 3744 NW. 36 No. 110, Oklahoma City, Okla. 73112, Vice President.

Letha M. Davis, 11032 NW. 114, Surrey Hills, Yukon, Okla. 73099, Secretary, Treasurer, Director.

The corporation will have two classes of stock: Class A Common (voting), and Class B Common (non-voting). SBA, in this instance, requires that the initial capitalization of the company be at least $300,000.

The applicant will conduct its operations principally in the State of Oklahoma and in other areas within the United States and its territories and possessions as may from time to time be approved by SBA. A diversified investment policy will be maintained.

Matters involved in SBA's consideration of the application include the general business reputation and character of shareholders and management and the probability of successful operations of the new company in accordance with the Act and regulations.

Notice is further given that any interested person may, on or before July 10, 1975 submit to SBA, in writing, relevant comments on the proposed licensing of this company. Any such communications should be addressed to: Associate Administrator for Finance and Investment, Small Business Administration, 1441 "L" Street, NW., Washington, D.C. 20416.

A copy of this notice shall be published by the proposed Licensee in a newspaper of general circulation in Oklahoma City, Oklahoma.

Dated: June 16, 1975.

JAMES THOMAS PHELAN,
Deputy Associate Administrator for Investment.

[FR Doc.75-16543 Filed 6-24-75;8:45 am]

[Declaration of Disaster Loan Area #1148]

NORTH CAROLINA

Declaration of Disaster Area

Mecklenburg and adjacent counties within the State of North Carolina constitute a disaster area because of damage resulting from flash flooding and heavy rains on May 30, 1975. Eligible persons, firms and organizations may file applications for loans for physical damage until the close of business on August 18, 1975, and for economic injury until the close of business on March 17, 1976, at:

Small Business Administration, District Office, 222 South Church Street, Charlotte, North Carolina 28202.

or other locally announced locations.

Dated: June 17, 1975.

THOMAS S. KLEPPE,
Administrator.

[FR Doc.75-16544 Filed 6-24-75;8:45 am]

WATER RESOURCES COUNCIL

STANDING STATE ADVISORY COMMITTEE

Meeting

In accordance with section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92-463), announcement is made of the following committee meeting:

Name: Standing State Advisory Committee (SSAC).

Date: July 9, 1975.

Place: Lower Level Conference Room, Lower Level, Gelman Building, 2120 L Street NW., Washington, D.C. 20037.

Time: 2 p.m. until 4:30 p.m.

Proposed agenda: (1) Discussion of WRC draft report entitled: A Unified National Program for Flood Plain Management (UNPFPM). (2) Discussion of WRC "Water for Energy" program. (3) Discussion of potential Interstate Conference on Water Problems/Water Resources Council meeting.

Purpose of Meeting:

The SSAC membership consists of the Executive Committee of the Interstate Conference on Water Problems (ICWP). The function of the SSAC is to further the WRC policy of close cooperation between the Council and the States in planning for use of the Nation's water and related land resources.

In accordance with Section 1302(c) of the National Flood Insurance Act of 1968 (Pub. L. 90-448), the UNPFPM report sets out a conceptual framework for a unified national program for flood plain management. As much of the responsibility for flood plain management rests with the States, discussion of this report provides the invaluable input of State viewpoint, an integral part of a comprehensive approach towards solving the problems of the Nation's flood plains.

The second agenda item similarly will afford State input with regard to the Council's "Water for Energy" program. Specifically, the SSAC will be asked to make recommendations on the development of a program to assist in the implementation of section 13 of the Federal Non-nuclear Energy Research and Development Act of 1974 (Pub. L. 93-577). Section 13 contains provisions whereby the WRC would assess water resource requirements and supply availabilities including environmental, social, and economic impacts.

The third item on the agenda provides for a discussion of a potential ICWP/WRC meeting tentatively scheduled to be held in Las Vegas, Nevada the week of October 13th. Discussion will focus around the agenda for the proposed meeting.

The meeting of the Standing State Advisory Committee (SSAC) is open to the public. Public attendance depending on available space, may be limited to those persons who have notified the SSAC Committee Management Officer in writing, at least 5 days prior to the meeting, of their intention to attend the July 9 meeting.

Any member of the public may file a written statement with the Committee before, during or after the meeting. To the extent that time permits, the Committee Chairman may allow public presentation of oral statements at the meeting.

All communications regarding the SSAC should be addressed to Richard N. Vannoy, Assistant Director, Water Resources Council, SSAC Committee Management Officer, 2120 L Street, NW, Washington, D.C. 20037.

WARREN D. FAIRCHILD,
Director.

[FR Doc.75-16545 Filed 6-24-75; 8:45am]

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Federal Insurance Administration

[Docket No. N-75-376]

NATIONAL FLOOD INSURANCE PROGRAM

Flood-Prone Areas of Communities Subject to July 1, 1975; Prohibition of Federal and Federally Related Assistance

The purpose of this notice is to provide a list of communities that contain areas of special flood hazard potentially subject to the provisions of section 202 of the Flood Disaster Protection Act of 1973 (Pub. L. 93-234) on July 1, 1975, and to provide a convenient reference for interested persons, communities, federal agencies and instrumentalities, and others involved in assuring compliance with that section.

Section 202 provides that effective July 1, 1975, federal agencies and federally supervised, approved, insured, or regulated lending institutions are prohibited from providing financial assistance or making loans for acquisition or construction purposes in areas which (a) have been designated by the Secretary of Housing and Urban Development as Special Flood Hazard Areas for at least one year; and (b) are in communities which are not participating in the National Flood Insurance Program (42 U.S.C. 4001-4128).

Each of the communities listed below received notice of its designation as flood-prone prior to July 1, 1974, and legal notice was furnished of such designation by publication under Part 1915 of Title 24 of the Code of Federal Regulations in the FEDERAL REGISTER. These communities have failed to provide the Federal Insurance Administrator with sufficient technical or scientific data to rebut their designation as flood prone. Thus, the sanctions of section 202 apply until the community participates in the program.

In order to continue federal or federally related assistance or lending in its Special Flood Hazard Area, a community must apply for and be made eligible for participation in the program in accordance with 24 CFR Parts 1909 to 1920. Communities may receive assistance in applying for participation by contacting the Federal Insurance Administration, 451 Seventh St., SW., Washington, D.C. 20410, (202) 755-5581, or its toll-free numbers 800-424-8872 or 800-424-8873.

Communities on this list may be made eligible to participate in the program after the date of publication of this list. Such eligibility will be published periodically in the FEDERAL REGISTER under 24 CFR 1914.4 List of eligible communities. At that point the sanctions of section 202 will no longer apply to such communities.

The list is as follows:

STATES

Alabama

	Date of Identification
Altoona, town of (Etowah County)	May 17, 1974
Attalla, city of (Etowah County)	Dec. 28, 1973
Autaugaville, town of (Autauga County)	June 7, 1974
Brighton, town of (Jefferson County)	May 10, 1974
Collinsville, town of (De Kalb County)	May 17, 1974
Cordova, city of (Walker County)	May 31, 1974
Cottonwood, town of (Houston County)	May 17, 1974
Demopolis, city of (Marengo County)	June 7, 1974
East Brewton, town of (Escambia County)	Nov. 23, 1973
Flomation, town of (Escambia County)	Do.
Fultondale, city of (Jefferson County)	May 24, 1974
Gadsden, city of (Etowah County)	March 8, 1974
Gantt, town of (Covington County)	June 7, 1974
Irondale, town of (Jefferson County)	Do.
Lipscomb, town of (Jefferson County)	June 14, 1974
Mount Vernon, town of (Mobile County)	Dec. 17, 1973
Odenville, town of (St. Clair County)	May 24, 1974
Piedmont, city of (Calhoun County)	June 7, 1974
Ragland, town of (St. Clair County)	May 24, 1974
Southside, town of (Etowah County)	Dec. 7, 1973
Valley Head, town of (De Kalb County)	May 3, 1974
Wadley, city of (Randolph County)	May 17, 1974
Weaver, city of (Calhoun County)	Nov. 30, 1973
Total	23

Alaska

Dillingham, city of (Bristol Bay Borough)	May 31, 1974
Haines, city of (Haines Borough)	Do.
Honnah, city of Lynn Canal-Icy Straits Borough)	June 7, 1974
Ketchikan, city of (Gateway Borough)	May 24, 1974
Soldotna, city of (Kenai Peninsula Borough)	June 14, 1974
Total	5

Arizona

Avondale, city of (Maricopa County)	Feb. 15, 1974
Benson, town of (Cochise County)	Jan. 16, 1974
El Mirage, town of (Maricopa County)	Feb. 15, 1974
Florence, town of (Pinal County)	May 3, 1974
Goodyear, town of (Maricopa County)	Mar. 15, 1974
Kearny, town of (Pinal County)	Nov. 30, 1973
Mammoth, town of (Pinal County)	Dec. 7, 1973
Parker, town of (Yuma County)	May 17, 1974
Show Low, city of (Navajo County)	June 7, 1974
Taylor, town of (Navajo County)	May 17, 1974
Winkleman, town of (Gila County)	Jan. 23, 1974
Yuma, city of (Yuma County)	Apr. 12, 1974
Total	12

Arkansas

	Date of Identification
Altheimer, city of (Jefferson County)	May 10, 1974
Bald Knob, city of (White County)	Mar. 8, 1974
Beebe, city of (White County)	Do.
Benton, city of (Saline County)	Nov. 16, 1973
Calico Rock, city of (Izard County)	Mar. 22, 1974
Carthage, city of (Dallas County)	Mar. 8, 1974
Clarksville, city of (Johnson County)	Nov. 30, 1973
Cotter, city of (Baxter County)	June 14, 1974
Farmington, city of (Washington County)	Apr. 12, 1974
Flippin, city of (Marion County)	June 7, 1974
Foreman, city of (Little River County)	Mar. 1, 1974
Hope, city of (Hempstead County)	Jan. 23, 1974
Hughes, city of (St. Francis County)	Oct. 12, 1973
Humphrey, city of (Arkansas and Jefferson Counties)	May 3, 1974
Imboden, town of (Lawrence County)	Do.
Joiner, city of (Mississippi County)	May 17, 1974
Keissa, city of (Mississippi County)	Do.
Kensett, city of (White County)	Oct. 13, 1973
Mansfield, city of (Scott and Sebastian Counties)	Mar. 15, 1974
McCrory, city of (Woodruff County)	Mar. 29, 1974
McRae, city of (White County)	Mar. 8, 1974
Montrose, town of (Ashley County)	May 3, 1974
Mountainburg, town of (Crawford County)	Do.
Newark, city of (Independence County)	Mar. 15, 1974
Oil Trough, city of (Independence County)	Mar. 22, 1974
Parkdale, city of (Ashley County)	Mar. 29, 1974
Rison, city of (Cleveland County)	Mar. 8, 1974
Russellville, city of (Pope County)	July 8, 1970
Stamps, town of (Lafayette County)	Jan. 23, 1974
Wabbaseka, city of (Jefferson County)	May 10, 1974
Waldo, city of (Columbia County)	Apr. 5, 1974
Wynne, city of (Cross County)	Mar. 22, 1974
Yellville, city of (Marion County)	Nov. 30, 1973
Total	**32**

California

Alameda, city of (Alameda County)	May 24, 1974
Alturas, city of (Modoc County)	May 31, 1974
Beaumont, city of (Riverside County)	Apr. 5, 1974
Bishop, city of (Inyo County)	June 7, 1974
Calexico, city of (Imperial County)	Feb. 1, 1974
Calipatria, city of (Imperial County)	Apr. 12, 1974
Capitola, city of (Santa Cruz County)	May 17, 1974
Carlsbad, city of (San Diego County)	May 31, 1974

California—Continued	*Date of Identification*
Coachella, city of (Riverside County)	May 17, 1974
Cupertino, city of (Santa Clara County)	Feb. 15, 1974
Daly City, city of (San Mateo County)	Feb. 22, 1974
Delano, city of (Kern County)	May 24, 1974
Desert Hot Springs, city of (Riverside County)	Do.
Dixon, city of (Solano County)	Mar. 15, 1974
El Centro, city of (Imperial County)	Feb. 1, 1974
Emeryville, city of (Alameda County)	Apr. 12, 1974, and Dec. 13, 1973
Etna, city of (Siskiyoo County)	Feb. 22, 1974
Exeter, city of (Tulare County)	Mar. 8, 1974
Galt, city of (Sacramento County)	May 17, 1974
Gonzales, city of (Monterey County)	May 24, 1974
Grass Valley, city of (Nevada County)	May 17, 1974
Gridley, city of (Butte County)	May 24, 1974
Guadalupe, city of (Santa Barbara County)	May 17, 1974
Half Moon Bay, city of (San Mateo County)	Mar. 1, 1974
Holtville, city of (Imperial County)	Apr. 5, 1974
Hughson, city of (Stanislaus County)	May 24, 1974
Huron, city of (Fresno County)	May 17, 1974
Indio, city of (Riverside County)	May 31, 1974
Ione, city of (Amador County)	May 24, 1974
La Palma, city of (Orange County)	June 14, 1974
Maricopa, city of (Kern County)	Do.
Mendota, city of (Fresno County)	Mar. 29, 1974
Monte Sereno, city of (Santa Clara County)	May 24, 1974
Morgan Hill, city of (Santa Clara County)	May 31, 1974
Napa, city of (Napa County)	Mar. 22, 1974
Oceanside, city of (San Diego County)	May 10, 1974
Orange Cove, city of (Fresno County)	May 10, 1974
Pinole, city of (Contra Costa County)	May 24, 1974
Placerville, city of (El Dorado County)	June 7, 1974
Rancho Mirage, city of (Riverside County)	June 14, 1974
Rio Dell, city of (Humboldt County)	May 24, 1974
Riverbank, city of (Stanislaus County)	May 10, 1974
San Bruno, city of (San Mateo County)	June 7, 1974
San Clemente, city of (Orange County)	June 14, 1974
San Jacinto, city of (Riverside County)	Sept. 28, 1973
San Joaquin, city of (Fresno County)	May 10, 1974
San Juan Bautista, city of (San Benito County)	Feb. 8, 1974
San Juan Capistrano, city of (Orange County)	May 10, 1974
Santa Cruz, city of (Santa Cruz County)	March 8, 1974
Scotts Valley, city of (Santa Cruz County)	May 31, 1974
Selma, city of (Fresno County)	May 24, 1974
Sonora, city of (Tuolumne County)	May 31, 1974
St. Helena, city of (Napa County)	Do.
Susanville, city of (Lassen County)	Feb. 1, 1974
Vista, city of (San Diego County)	June 14, 1974
Wasco, city of (Kern County)	May 17, 1974
Westmorland, city of (Imperial County)	May 24, 1974
Willits, city of (Mendocino County)	Feb. 8, 1974
Total	58
Colorado	
Breckenridge, town of (Summit County)	May 24, 1974
Buena Vista, town of (Chaffee County)	May 3, 1974
Craig, city of (Moffat County)	Do.
Dove Creek, town of (Dolores County)	May 24, 1974
Florence, city of (Fremont County)	May 17, 1974
Grand Junction, city of (Mesa County)	Feb. 1, 1974 June 28, 1974
Hugo, town of (Lincoln County)	May 31, 1974
La Fayette, city of (Boulder County)	May 24, 1974
La Jara, town of (Conejos County)	May 17, 1974
Leadville, city of (Lake County)	Do.
Loveland, city of (Larimer County)	Mar. 1, 1974
Mancos, town of Montezuma County)	Do.
Manzanola, town of (Otero County)	May 17, 1974
Milliken, town of (Weld County)	May 24, 1974
Nucla, town of (Montrose County)	May 17, 1974
Otis, town of (Washington County)	May 24, 1974
Ouray, city of (Ouray County)	Do.
Rifle, city of (Garfield County)	June 15, 1973
San Luis, town of (Costilla County)	May 24, 1974
Sterling, city of (Logan County)	Jan. 23, 1974
Yampa, city of (Croutt County)	May 24, 1974
Total	21
Connecticut	
Becon Falls, town of (New Haven County)	May 3, 1974
Bethel, town of (Fairfield County)	Apr. 5, 1974
Bolton, town of (Tolland County)	June 7, 1974
Colchester, city of (New London County)	Do.
Roxbury, town of (Litchfield County)	Do.
Southington, town of (Hartford County)	May 10, 1974
Sterling, town of (Windham County)	May 31, 1974
Thomaston, town of (Litchfield County)	Do.
Thompson, town of (Windham County)	May 17, 1974
Voluntown, town of (New London County)	May 31, 1974
Washington Depot, town of (Litchfield County)	March 8, 1974
Williamantic, city of (Windham County)	May 10, 1974
Windham, town of (Windham County)	Apr. 12, 1974
Winsted, city of (Litchfield County)	May 17, 1974
Wolcott, town of (New Haven County)	May 3, 1974
Total	16
Delaware	
Dover, city of (Kent County)	May 31, 1974
Greenwood, town of (Sussex County)	May 24, 1974
Total	2
Florida	
Bonifay, city of (Holmes County)	Nov. 16, 1973
Branford, town of (Suwannee County)	Jan. 9, 1974
Briny Breezes, town of (Palm Beach County)	Jan. 23, 1974
Carabelle, city of (Franklin County)	Jan. 23, 1974
Fellsmere, city of (Indian River County)	Jan. 16, 1974
Lakeland, city of (Polk County)	Mar. 1, 1974
Madison, city of (Madison County)	May 24, 1974
Mangonia Park, town of (Palm Beach County)	Jan. 16, 1974
Orchid, town of (Indian River County)	Jan. 23, 1974
Pembroke Park, town of (Broward County)	May 31, 1974
Quincy, city of (Gadsden County)	Mar. 1, 1974
Sebastian, town of (Indian River County)	Feb. 8, 1974
Wauchula, city of (Sumter County)	Nov. 23, 1973
Webster, town of (Sumter County)	Do.
White Springs, town of (Hamilton County)	Jan. 16, 1974
Wildwood, town of (Sumter County)	Jan. 23, 1974
Yankeetown, town of (Levy County)	Aug. 20, 1971
Zephyrhills, city of (Pasco County)	Feb. 1, 1974
Zolfo Springs, town of (Hardee County)	Jan. 16, 1974
Total	19
Georgia	
Adairsville, town of (Bartow County)	June 14, 1974
Brooklet, town of (Bulloch County)	Apr. 5, 1974
Clayton, town of (Rabun County)	May 24, 1974
Crawford, city of (Oglethorpe County)	June 7, 1974
Cumming, city of (Forsyth County)	June 14, 1974
Cusseta, city of (Chattahoochee County)	Apr. 12, 1974
Duluth, city of (Gwinnett County)	May 24, 1974
Franklin, town of (Heard County)	May 10, 1974
Hawkinsville, city of (Pulaski County)	May 3, 1974
Homerville, city of (Clinch County)	June 7, 1974
Jackson, city of (Butts County)	May 17, 1974
Jonesboro, city of (Clayton County)	May 24, 1974

Georgia—Continued

	Date of Identification
Kennesaw, town of (Cobb County)	June 14, 1974
Ludowici, city of (Long County)	Do.
McCaysville, city of (Frannin County)	Mar. 22, 1974
Mount Vernon, city of (Montgomery County)	May 31, 1974
Mountain View, city of (Clayton County)	May 10, 1974
Palmetto, city of (Fulton & Coweta Counties)	June 14, 1974
Pembroke, city of (Bryan County)	May 10, 1974
Porterdale, town of (Newton County)	Apr. 12, 1974
Poulan, city of (Worth County)	May 17, 1974
Riceboro, city of (Liberty County)	May 10, 1974
Stone Mountain, city of (De Kalb County	May 12, 1974
Unadilla, town of (Dooly County)	June 14, 1974
Vernonburg, town of (Chatham County)	July 27, 1973
Waverly Hall, town of (Harris County)	June 14, 1974
Woodbine, city of (Camden County)	Do.
Young Harris, town of (Towns County)	Do.
Total	28

Idaho

American Falls, city of (Power County)	May 24, 1974
Burley, city of (Cassia County)	Do.
Coeur D'Alene, city of (Kootenai County)	Mar. 29, 1974
Council, city of (Adams County)	May 3, 1974
Garden City, city of (Ada County)	Dec. 17, 1973
Harrison, city of (Kootenai County)	Mar. 22, 1974
Malad City, city of (Oneida County)	May 24, 1974
Nezperce, city of (Lewis County)	Nov. 23, 1973
Parma, city of (Canyon County)	May 17, 1974
Total	9

Illinois

	Date of Identification
Abingdon, city of (Knox County)	June 7, 1974
Altamont, city of (Effingham County)	Mar. 22, 1974
Anna, city of (Union County)	Mar. 29, 1974
Armington, village of (Tazewell County)	Mar. 22, 1974
Arthur, village of (Moultrie County)	May 3, 1974
Atwood, village of (Piatt County)	Nov. 23, 1973
Banner, village of (Fulton County)	Dec. 28, 1973
Bath, village of (Mason County)	Dec. 17, 1973
Bement, village of (Piatt County)	June 14, 1974
Bluffs, village of (Scott County)	June 7, 1974
Bonnie, village of (Jefferson County)	Feb. 15, 1974
Breese, city of (Clinton County)	June 7, 1974
Bridgeview, village of (Cook County)	Mar. 22, 1974
Brookport, city of (Massac County)	June 7, 1974
Broughton, village of (Hamilton County)	Mar. 1, 1974
Bushnell, city of (McDonough County)	June 7, 1974
Bush, village of (Williamson County)	Mar. 29, 1974
Byron, city of (Ogle County)	May 10, 1974
Calumet Park, village of (Cook County)	Mar. 29, 1974
Camargo, village of (Douglas County)	April 5, 1974
Carbon Hills, village of (Grundy County)	Mar. 8, 1974
Carlinville, city of (Macoupin County)	June 14, 1974
Carlyle, city of (Clinton County)	Dec. 7, 1973
Carrollton, city of (Greene County)	June 7, 1974
Carterville, city of (Williamson County)	Feb. 15, 1974
Cave-in-Rock, village of (Hardin County)	Jan. 23, 1974
Central City, village of (Marion County)	Feb. 15, 1974
Centralia, city of (Clinton and Marion Counties)	May 3, 1974
Chandlerville, village of (Cass County)	Nov. 23, 1973
Channohon, village of (Will County)	Mar. 29, 1974
Chatman, village of (Sangamon County)	Nov. 16, 1973
Clay City, village of (Clay County)	Mar. 22, 1974
Clinton, city of (De Witt County)	May 24, 1974
Columbia, city of (Monroe County)	May 17, 1974
Creve Couer, village of (Tazewell County)	Feb. 22, 1974
Cullom, village of (Livingston County)	Do.
Dallas City, city of (Hancock County)	Mar. 22, 1974
De Soto, village of (Jackson County)	April 5, 1974
Dixmoor, village of (Cook County)	Do.
Dongola, village of (Union County)	Mar. 8, 1974
Durand, village of (Winnebago County)	April 5, 1974
Edwardsville, city of (Madison County)	Do.
Effingham, city of (Effingham County)	Mar. 22, 1974
Eileen, village of (Grundy County)	Mar. 8, 1974
Eldorado, city of (Saline County)	Feb. 22, 1974
Eldred, village of (Greene County)	Dec. 17, 1973
Elizabethtown, village of (Hardin County)	Jan. 16, 1974
Ellisville, village of (Fulton County)	Mar. 22, 1974
Equality, village of (Gallatin County)	Do.
Evansville, village of (Randolph County)	Mar. 1, 1974
Fayetteville, village of (St. Clair County)	Feb. 22, 1974
Florence, village of (Pike County)	Dec. 17, 1973
Foosland, village of (Champaign County)	Mar. 29, 1974
Forreston, village of (Ogle County)	June 7, 1974
Forrest, village of (Livingston County)	Mar. 1, 1974
Freeburg, village of (St. Clair County)	Mar. 22, 1974
Fulton, city of (Whiteside County)	May 31, 1974
Fults, village of (Monroe County)	Dec. 17, 1973
Galatia, village of (Saline County)	Mar. 1, 1974
Galva, city of (Henry County)	June 14, 1974
Genoa, city of (De Kalb County)	Mar. 1, 1974
Georgetown, city of (Vermilion County)	May 17, 1974
Germantown, village of (Clinton County)	Mar. 29, 1974
Gibson City, city of (Ford County)	Do.
Gillespie, city of (Macoupin County)	June 7, 1974
Gilman, city of (Iroquois County)	June 7, 1974
Golconda, city of (Pope County)	Jan. 23, 1974
Golden, village of (Adams County)	June 7, 1974
Green Rock, village of (Henry County)	Jan. 16, 1974
Greenfield, city of (Green County)	Feb. 22, 1974
Greenview, village of (Menard County)	Nov. 23, 1973
Greenville, city of (Bond County)	June 14, 1974
Hammond, village of (Piatt County)	Do.
Hampshire, village of (Kane County)	May 3, 1974
Hanover, village of (Jo County)	April 5, 1974
Havana, city of (Mason County)	Do.
Heyworth, village of (McLean County)	June 14, 1974
Hillsboro, city of (Montgomery County)	May 17, 1974
Hillside, village of (Cook County)	May 3, 1974
Hinckley, village of (Dekalb County)	Mar. 1, 1974
Hopedale, village of (Tazewell County)	Apr. 5, 1974
Hurst, village of (Williamson County)	Mar. 15, 1974
Jerseyville, city of (Jersey County)	June 7, 1974
Joppa, village of (Massac County)	Nov. 23, 1973
Kingston Mines, village of (Peoria County)	Dec. 28, 1973
Kirkwood, village of (Warren County)	May 24, 1974
Knoxville, city of (Knox County)	June 7, 1974
Lacon, city of (Marshall County)	Nov. 30, 1973
Lake Bluff, village of (Lake County)	Feb. 1, 1974
Lawrenceville, city of (Lawrence County)	Mar. 8, 1974
Leaf River, village of (Ogle County)	Nov. 23, 1973
Lebanon, city of (St. Clair County)	Nov. 16, 1973
Livingston, village of (Madison County)	Mar. 22, 1974
Loami, village of (Sangamon County)	Mar. 29, 1974
Malta, village of (Dekalb County)	June 7, 1974
Manlius, village of (Bureau County)	Mar. 8, 1974
Marquette Heights, city of (Tazewell County)	Do.
Martinsville, city of (Clark County)	Nov. 23, 1973

Illinois—Continued

	Date of Identification
Maunie, village of (White County)	Jan. 9, 1974
Maywood, village of (Cook County)	Feb. 1, 1974
McLeansboro, city of (Hamilton County)	Mar. 22, 1974
Metropolis, city of (Massac County)	Mar. 8, 1974
Momence, City of (Kankakee County)	Jan. 9, 1974
Mount Carmel, city of (Wabash County)	Mar. 15, 1974
Moweaqua, village of Shelby County)	June 7, 1974
Muddy, village of (Saline County)	Mar. 22, 1974
Nashville, city of (Washington County)	May 17, 1974
Nebo, village of (Pike County)	Dec. 28, 1973
New Athens, village of (St. Clair County)	Mar. 22, 1974
New Baden, village of (Clinton County)	May 24, 1974
New Haven, village of (Gallatin County)	Jan. 16, 1974
Newton, city of (Jasper County)	Dec. 17, 1973
Niantic, village of (Macon County)	Mar. 1, 1974
Nokomis, city of (Montgomery County)	Mar. 29, 1974
North Pekin, village of (Tazewell County)	Mar. 8, 1974
Oakwood, village of (Vermillion County)	Mar. 29,1974
Oglesby, city of (LaSalle County)	May 24, 1974
Old Shawneetown, village of (Gallatin County)	Dec. 17, 1973
Olney, city of (Richland County)	Feb. 22, 1974
Omaha, village of (Gallatin County)	May 10, 1974
Oneida, city of (Knox County)	June 7, 1974
Palestine, town of (Crawford County)	Nov. 23, 1973
Paris, city of (Edgar County)	May 3, 1974
Park City, village of (Lake County)	Mar. 1, 1974
Park Ridge, city of (Cook County)	Feb. 22, 1974 and Nov. 22, 1973
Paw Paw, village of (Lee County)	June 14, 1974
Pawnee, village of (Sangamon County)	May 17, 1974
Pearl City, village of (Stephenson County)	May 3, 1974
Pearl, village of (Pike County)	Dec. 28, 1974
Pecantonica, village of (Winnebago County)	Apr. 5, 1974
Pekin, city of (Tazewell County)	Apr. 12, 1974
Petersburg, city of (Menard County)	Dec. 7, 1973
Phoenix, village of (Cook County)	Apr. 12, 1974
Pinckneyville, city of (Perry County)	Mar. 22, 1974
Pittsfield, city of (Pike County)	June 7, 1974
Pleasant Plains, village of (Sangamon County)	Mar. 22, 1974
Polo, city of (Ogle County)	May 17, 1974
Pontoosuc, village of (Hancock County)	Jan. 16, 1974
Potomac, village of (Vermillion County)	Mar. 22, 1974
Pulaski, village of (Pulaski County)	May 17, 1974
Rankin, village of (Vermillion County)	Do.
Rantoul, village of (Champaign County)	Apr. 12, 1974
Ridgway, village of (Gallatin County)	Feb. 22, 1974
Ridott, village of (Stephenson County)	Dec. 17, 1973
Riverton, village of (Sangamon County)	Nov. 16, 1973
Riverwoods, village of (Lake County)	Mar. 1, 1974
Robinson, city of (Crawford County)	May 31, 1974
Romeoville, village of (Will County)	Mar. 29, 1974
Roseville, village of (Warren County)	May 17, 1974
Rosiclare, city of (Hardin County)	Dec. 17, 1973
Round Lake Park, village of (Lake County)	Mar. 29, 1974
Rushville, city of (Schuyler County)	Mar. 1, 1974
Sheridan, village of (La Salle County)	Apr. 12, 1974
Sidney, village of (Champaign County)	Jan. 16, 1974
Silvis, city of (Rock Island County)	May 31, 1974
Smithton, village of (St. Clair County)	Mar. 29, 1974
South Barrington, village of (Cook County)	Mar. 22, 1974
South Chicago Heights, village of (Cook County)	Apr. 12, 1974
South Jacksonville, city of (Morgan County)	Mar. 29, 1974
Sparland, village of (Marshall County)	Nov. 23, 1973
Springfield, city of (Sangamon County)	June 7, 1974
Staunton, city of (Macoupin County)	May 17, 1974
Stickney, village of (Cook County)	Mar. 29, 1974
St. Francisville, village of (Lawrence County)	Do.
St. Joseph, village of (Champaign County)	Nov. 23, 1973
Sugar Grove, village of (Kane County)	Mar. 8, 1974
Summerfield, village of (St. Clair County)	May 3, 1974
Sumner, city of (Lawrence County)	Mar. 1, 1974
Sycamore, city of (De Kalb County)	Apr. 5, 1974
Tallula, village of (Menard County)	Mar. 29, 1974
Tamms, village of (Alexander County)	May 10, 1974
Teutopolis, village of (Effingham County)	Feb. 22, 1974
Thayer, village of (Sangamon County)	Mar. 22, 1974
Toluca, city of (Marshall County)	Apr. 5, 1974
Toulon, city of (Stark County)	May 31, 1974
Tuscola, city of (Douglas County)	Nov. 30, 1973
Valley City, village of (Pike County)	Dec. 17, 1973
Verona, village of (Grundy County)	May 3, 1974
Victoria, village of (Knox County)	June 7, 1974
Virginia, city of (Cass County)	Apr. 5, 1974
Wadsworth, village of (Lake County)	Mar. 1, 1974
Wataga, village of (Knox County)	June 7, 1974
West Chicago, city of (Du Page County)	Apr. 12, 1974
West Dundee, village of (Kane County)	Apr. 5, 1974
Wheeler, village of (Jasper County)	Feb. 22, 1974
White Hall, city of (Greene County)	Apr. 5, 1974
Winslow, village of (Stephenson County)	Mar. 15, 1974
Winthrop Harbor, village of (Lake County)	Mar. 8, 1974
Yates City, village of (Knox County)	June 14, 1974
Total	189

Indiana

	Date of Identification
Albion, town of (Noble County)	June 7, 1974
Alton, town of (Crawford County)	Jan. 23, 1974
Andrews, town of (Huntington County)	June 7, 1974
Arcadia, town of (Hamilton County)	Feb. 1, 1974
Attica, city of (Fountain County)	Dec. 7, 1973
Austin, city of (Scott County)	Nov. 23, 1973
Battle Ground, city of (Tippecanoe County)	May 24, 1974
Bicknell, town of (Knox County)	May 17, 1974
Bloomfield, town of (Greene County)	Nov. 23, 1973
Boonville, city of (Warrick County)	Dec. 28, 1973
Bremen, town of (Marshall County)	Nov. 23, 1973
Bristol, town of (Elkhart County)	Do.
Brooklyn, town of (Morgan County)	Dec. 7, 1973
Brown County, unincorporated area	Apr. 13, 1973
Brownsburg, town of (Hendricks County)	Nov. 23, 1973
Brownstown, town of (Jackson County)	Do.
Burlington, town of (Carroll County)	Do.
Camden, town of (Carroll County)	Do.
Cayuga, town of (Vermillion County)	May 31, 1974
Cedar Grove, town of (Franklin County)	Dec. 7, 1973
Cedar Lake, town of (Lake County)	Dec. 28, 1973
Chandler, town of (Warrick County)	Jan. 9, 1974
Charlestown, city of (Clark County)	Apr. 12, 1974
Churubusco, town of (Whitley County)	May 31, 1974
Columbia City, city of (Whitley County)	Dec. 17, 1973
Converse, town of (Miami County)	May 17, 1974
Covington, city of (Fountain County)	Jan. 9, 1974
Decker, town of (Knox County)	Feb. 1, 1974
Delphi, city of (Carroll County)	Nov. 23, 1973
Denver, town of (Miami County)	Feb. 1, 1974
Eaton, town of (Delaware County)	Nov. 23, 1973
Edwardsport, town of (Knox County)	Do.
English, town of (Crawford County)	Apr. 12, 1974
Fairmount, town of (Grant County)	May 24, 1974
Fountain City, city of (Wayne County)	May 10, 1974
French Lick, town of (Orange County)	Feb. 1, 1974

Indiana—Continued

	Date of Identification
Gosport, town of (Owen County)	Nov. 23, 1973
Greenfield, city of (Hancock County)	Do.
Hartford City, city of (Blackford County)	Do.
Hazleton, town of (Gibson County)	Do.
Hillsboro, town of (Fountain County)	Feb. 1, 1974
Huntertown, town of (Allen and De Kalb Counties)	May 31, 1974
Huntington, city of (Huntington County)	June 7, 1974
Jonesboro, town of (Grant County)	Dec. 7, 1973
Judson, town of (Parke County)	Dec. 17, 1973
Kentland, town of (Newton County)	May 24, 1974
Knightstown, town of (Henry County)	Nov. 30, 1973
Lacrosse, town of (Laporte County)	May 31, 1974
Ladoga, town of (Montgomery County)	May 24, 1974
Lagro, town of (Wabash County)	Do.
Leavenworth, town of (Crawford County)	Nov. 30, 1973
Lebanon, city of (Boone County)	May 3, 1974
Marengo, town of (Crawford County)	Feb. 1, 1974
Mecca, town of (Parke County)	Jan. 23, 1974
Medora, town of (Jackson County)	Nov. 23, 1973
Milltown, town of (Crawford and Harrison Countys)	Nov. 30, 1973
Monterey, town of (Pulaski County)	Feb. 1, 1974
Montpelier, town of (Blackford County)	Dec. 7, 1973
New Palestine, town of (Hancock County)	Nov. 30, 1973
New Whiteland, town of (Johnson County)	Jan. 16, 1974
Newberry, town of (Greene County)	Feb. 1, 1974
Newport, town of (Vermillion County)	May 31, 1974
North Vernon, city of (Jennings County)	Nov. 30, 1973
Oakland City, city of (Gibson County)	May 10, 1974
Ogden Dunes, town of (Porter County)	May 31, 1974
Orland, town of (Steuben County)	Do.
Orleans, town of (Orange County)	Do.
Osceola, town of (St. Joseph County)	Dec. 17, 1973
Paoli, town of (Orange County)	Nov. 23, 1973
Paragon, town of (Morgan County)	Feb. 1, 1974
Pennville, town of (Wayne County)	Do.
Plainfield, town of (Hendricks County)	Do.
Remington, town of (Jasper County)	May 31, 1974
Ridgeville, town of (Randolph County)	Nov. 30, 1973
Riley, town of (Vigo County)	Feb. 1, 1974
Roann, town of (Wabash County)	Dec. 7, 1973
Roanoke, town of (Huntington County)	Dec. 28, 1973
Rochester, city of (Fulton County)	Feb. 15, 1974
Rosedale, town of (Parke County)	Nov. 30, 1973
Rushville, city of (Rush County)	Dec. 7, 1973
Schneider, town of (Lake County)	Dec. 17, 1973
Sellersburg, town of (Clark County)	Nov. 23, 1973
South Whitley, town of (Whitley County)	Dec. 21, 1973
Spencerville, town of (Dekalb County)	Feb. 15, 1974
Spencer, city of (Owen County)	Dec. 17, 1973
Spring Lake Park, town of (Hancock County)	Feb. 1, 1974
Springport, town of (Henry County)	Do.
Stinesville, town of (Monroe County)	Do.
St. Joe, town of (De Kalb County)	Dec. 7, 1973
Sulphur Springs, town of (Henry County)	Feb. 1, 1974
Tennyson, town of (Warrick County)	Do.
Tipton, city of (Tipton County)	Dec. 28, 1973
Troy, town of (Perry County)	May 31, 1974
Universal, town of (Vermillion County)	Feb. 1, 1974
Veedersburg, town of (Fountain County)	Dec. 17, 1973
Vera Cruz, town of (Wells County)	Dec. 7, 1973
Wabash, city of (Wabash County)	June 7, 1974
Walkerton, town of (St. Joseph County)	Nov. 23, 1973
Walton, town of (Cass County)	May 17, 1974
Waveland, town of (Montgomery County)	May 24, 1974
Waynetown, town of (Montgomery County)	May 31, 1974
West Baden Springs, town of (Orange County)	Dec. 28, 1973
Westfield, town of (Hamilton County)	Feb. 1, 1974
Whitestown, town of (Boone County)	Apr. 12, 1974
Williamsport, town of (Warren County)	Dec. 17, 1973
Winona Lake, town of (Kosciusko County)	May 3, 1974
Winslow, town of (Pike County)	Dec. 17, 1973
Wolcott, town of (White County)	June 14, 1974
Worthington, town of (Greene County)	Nov. 23, 1973
Total	109

Iowa

	Date of Identification
Anthon, town of (Woodbury County)	Jan. 23, 1974
Atlantic, city of (Cass County)	May 3, 1974
Bedford, town of (Taylor County)	Feb. 1, 1974
Belmond, city of (Wright County)	May 3, 1974
Bonaparte, city of (Van Buren County)	Jan. 9, 1974
Cascade, city of (Dubuque County)	Dec. 17, 1973
Centerville, city of (Appanoose County)	Mar. 22, 1974
Clear Lake, city of (Cerro Gordo County)	May 24, 1974
Colfax, city of (Jasper County)	Jan. 23, 1974
Columbus Junction, city of (Louisa County)	Jan. 9, 1974
Danbury, city of (Woodbury County)	Do.
Donnellson, town of (Lee County)	May 10, 1974
Dow City, town of (Crawford County)	May 31, 1974
Dumont, town of (Butler County)	May 24, 1974
Dunlap, town of (Harrison County)	May 17, 1974
Eldon, town of (Wapello County)	Dec. 17, 1973
Exira, town of (Audubon County)	May 10, 1974
Fredericksburg, town of (Chickasaw County)	May 3, 1974
Granger, town of (Dallas County)	Mar. 22, 1974
Greene, town of (Butler County)	May 17, 1974
Guthrie Center, city of (Guthrie County)	Do.
Hamburg, city of (Fremont County)	June 14, 1974
Hills City, city of (Johnson County)	Dec. 28, 1973
Hudson, town of (Black Hawk County)	Mar. 8, 1974
Indianola, city of (Warren County)	June 7, 1974
Janesville, town of (Black Hawk and Bremer Counties)	Dec. 28, 1973
Lansing, town of (Allamakee County)	Jan. 16, 1974
Le Mars, city of (Plymouth County)	Do.
Malvern, town of (Mills County)	Mar. 8, 1974
Marion, city of (Linn County)	Mar. 1, 1974
Montrose, town of (Lee County)	Jan. 23, 1974
Mount Vernon, city of (Linn County)	Mar. 8, 1974
New Albin, town of (Allamakee County)	May 17, 1974
Oxford, town of (Johnson County)	May 10, 1974
Raymond, town of (Black Hawk County)	Mar. 22, 1974
Riverdale, town of (Scott County)	Jan. 23, 1974
Rockford, town of (Floyd and Howard Counties)	Feb. 1, 1974
Sac City, city of (Sac County)	Dec. 28, 1973
Sergeant Bluff, town of (Woodbury County)	Mar. 29, 1974
Sibley, city of (Osceola County)	May 17, 1974
Sigourney, city of (Keokuk County)	Mar. 15, 1974
Sioux Rapids, town of (Buena Vista County)	May 10, 1974
Sloan, town of (Woodbury County)	May 24, 1974
Spirit Lake, city of (Dickinson County	May 31, 1974
Story City, city of (Story County)	Do.
Sumner, city of (Bremer County)	May 3, 1974
Tipton, city of (Cedar County)	Mar. 29, 1974
Wapello, city of (Louisa County)	Jan. 16, 1974
Waukon, city of (Allamakee County)	Mar. 22, 1974
West Branch, city of (Cedar County)	Mar. 1, 1974
What Cheer, city of (Keokuk County)	Jan. 9, 1974
Total	51

Kansas

	Date of Identification
Alma, city of (Wabaunsee County)	Mar. 8, 1974
Almena, city of (Norton County)	Mar. 1, 1974
Ashland, city of (Clark County)	May 17, 1974
Augusta, city of (Butler County)	Feb. 1, 1974
Basehor, city of (Leavenworth County)	Apr. 12, 1974
Baxter Springs, city of (Cherokee County)	May 24, 1974
Belleveille, city of (Republic County)	Feb. 15, 1974
Beloit, city of (Mitchell County)	Dec. 7, 1973
Burrton, city of (Harvey County)	Mar. 15, 1974
Caney, city of (Montgomery County)	Feb. 15, 1974
Carbondale, city of (Osage County)	May 24, 1974
Centralia, city of (Nemaha County)	Do.
Clyde, city of (Cloud County)	May 31, 1974
Columbus, city of (Cherokee County)	Mar. 1, 1974
Deerfield, city of (Kearny County)	Dec. 28, 1973
Edgerton, city of (Johnson County)	Mar. 8, 1974
Elkhart, city of (Morton County)	May 24, 1974
Ellinwood, city of (Barton County)	Mar. 15, 1974
Ellsworth, city of (Ellsworth County)	Dec. 28, 1973
Eureka, city of (Greenwood County)	Apr. 12, 1974
Frankfort, city of (Marshall County)	Jan. 23, 1974
Fredonia, city of (Wilson County)	Jan. 23, 1973
Gardner, city of (Johnson County)	May 3, 1974
Garnett, city of (Anderson County)	Feb. 8, 1974
Grandview Plaza, city of (Geary County)	Feb. 1, 1974
Hiawatha, city of (Brown County)	Aug. 9, 1974
Holton, city of (Jackson County)	Feb. 8, 1974
Jetmore, city of (Hodgeman County)	Feb. 22, 1974
Johnson City, city of (Stanton County)	Mar. 1, 1974
La Cygne, city of (Linn County)	May 24, 1974
Lecompton, city of (Douglas County)	Mar. 15, 1974
Leroy, city of (Coffey County)	Jan. 23, 1974
Lincoln, city of (Lincoln County)	Dec. 28, 1973
Louisburg, city of (Miami, County)	Mar. 8, 1974
Lyndon, city of (Osage County)	Mar. 1, 1974
Marquette, city of (McPherson County)	Do.
McLouth, city of (Jefferson County)	Dec. 17, 1973
Minneola, city of (Clark County)	Mar. 22, 1974
Moline, city of (Elk County)	Feb. 8, 1974
Mound City, city of (Linn County)	Feb. 22, 1974
Nortonville, city of (Jefferson County)	Mar. 1, 1974
Norton, city of (Norton County)	Do.
Ogden, city of (Riley County)	Feb. 15, 1974
Osage City, city of (Osage County)	June 7, 1974
Osborne, city of (Osborne County)	Mar. 1, 1974
Oskaloosa, city of (Jefferson County)	Mar. 15, 1974
Ottawa, city of (Franklin County)	May 24, 1974
Pomona, city of (Franklin County)	Jan. 9, 1974
Riley, city of (Riley County)	Feb. 8, 1974
Roeland Park, city of (Johnson County)	Feb. 15, 1974
Rossville, city of (Shawnee County)	May 31, 1974
Russell, city of (Russell County)	Jan. 9, 1974
Syracuse, city of (Hamilton	Feb. 8, 1974 Nov. 8, 1973 Jan. 9, 1974
Troy, city of (Doniphan County)	Feb. 15, 1974
Waverly, city of (Coffey County)	Do.
Wellsville, city of (Franklin County)	Do.
Westmoreland, city of (Pottawatomie County)	Mar. 8, 1974
Total	57

Kentucky

	Date of Identification
Albany, city of (Clinton County)	May 10, 1974
Allen, town of (Floyd County)	Jan. 23, 1974
Arlington, town of (Carlisle County)	May 17, 1974
Bardstown, city of (Nelson County)	May 31, 1974
Bardwell, town of (Carlisle County)	May 17, 1974
Bloomfield, city of (Nelson County)	May 10, 1974
Booneville, city of (Owsley County)	Feb. 1, 1974
Bradfordsville, city of (Marion County)	May 10, 1974
Brodhead, city of (Rock Castle County)	May 17, 1974
Burgin, city of (Mercer County)	May 10, 1974
Burkesville, city of (Cumberland County)	Feb. 15, 1974
Calhoun, town of (McLean County)	Feb. 1, 1974
California, village of (Campbell County)	Mar. 15, 1974
Calvert City, town of (Marshall County)	Feb. 1, 1974
Campbellsville, city of (Taylor County)	May 24, 1974
Campton, city of (Wolff County)	May 17, 1974
Catlettsburg town of (Boyd County)	May 3, 1974
Central City, city of (Muhlenberg County)	Feb. 1, 1974
Clay City, city of (Powell County)	Do.
Clay, city of (Webster County)	Do.
Clinton, town of (Hickman County)	May 17, 1974
Corbin, city of (Whitley County)	June 14, 1974
Danville, city of (Boyle County)	May 31, 1974
Dawson Springs, city of (Hopkins County)	Feb. 1, 1974
Falmouth, city of (Pendleton County)	May 24, 1974
Flemingsburg, town of (Fleming County)	June 7, 1974
Florence, town of (Boone County)	Feb. 1, 1974
Fort Thomas, city of (Campbell County)	Jan. 25, 1974 and Oct. 18, 1974
Georgetown, city of (Scott County)	May 24, 1974
Ghent, town of (Carroll County)	Jan. 16, 1974
Glencoe, city of (Gallatin County)	Feb. 1, 1974
Grayson, city of (Carter County)	Do.
Greensburg, city of (Green County)	Do.
Greenup, town of (Greenup County)	Jan. 23, 1974
Guthrie, town of (Todd County	June 7, 1974
Hardin, city of (Marshall County)	June 14, 1974
Hardin, town of (Marshall County)	May 10, 1974
Harrodsburg, city of (Mercer County)	Do.
Hindman, city of (Knott County)	May 31, 1974
Hodgenville, town of (Larue County)	May 17, 1974
Hyden, city of (Leslie County)	May 24, 1974
Jackson, city of (Breathitt County)	May 17, 1974
Jamestown, city of (Russell County)	May 10, 1974
Jenkins, city of (Letcher County)	June 7, 1974
Lebanon Junction, city of (Bullitt County)	Mar. 15, 1974
Leitchfield, town of (Grayson County)	May 10, 1974
Livermore, town of (McLean County)	Feb. 1, 1974
Manchester, city of (Clay County)	Do.
Martin, town of (Floyd County)	May 24, 1974
Millersburg, city of (Bourbon County)	May 10, 1974
Monticello, town of (Wayne County)	May 24, 1974
Morganfield, town of (Union County)	May 17, 1974
Morgantown, town of (Butler County)	Feb. 1, 1974
Mortons Gap, town of (Hopkins County)	May 17, 1974
Mount Sterling, city of (Montgomery County)	May 10, 1974
Neon, town of (Letcher County)	Jan. 23, 1974
New Haven, city of (Nelson County)	Do.
Nortonville, town of (Hopkins County)	May 17, 1974
Olive Hill, city of (Carter County)	Feb. 1, 1974
Petersburg, town of (Boone County)	Jan. 23, 1974
Princeton, town of (Caldwell County)	May 31, 1974
Providence, city of (Webster County)	Feb. 1, 1974
Raceland, town of (Greenup County)	Feb. 8, 1974
Rochester, town of (Butler County)	Feb. 1, 1974
Rockport, town of (Ohio County)	Do.
Russell, town of (Greenup County)	Feb. 8, 1974
Salyersville, town of (Magoffin County)	Feb. 22, 1974
Sanders, town of (Carroll County)	Jan. 23, 1974
Sebree, city of (Webster County)	May 17, 1974

Kentucky—Continued

	Date of Identification
Shepherdsville, city of (Bullitt County)	May 24, 1974
Smithland, town of (Livingston County)	Feb. 1, 1974
South Shore, town of (Greenup County)	Do.
Sparta, city of (Gallatin County)	Do.
Stanton, city of (Powell County)	May 24, 1974
Taylorsville, town of (Spencer County)	Feb. 1, 1974
Uniontown, town of (Union County)	May 17, 1974
Vanceburg, town of (Lewis County)	Feb. 1, 1974
Vicco, city of (Perry County)	May 10, 1974
Vine Grove, city of (Hardin County)	May 17, 1974
Visalia, city of (Kenton County)	Jan. 23, 1974
Warsaw, city of (Gallatin County)	Feb. 1, 1974
Wheat Croft, town of (Webster County)	Feb. 15, 1974
Winston Park, town of (Webster County)	Jan. 23, 1974
Woodbury, town of (Butler County)	Feb. 1, 1974
Worthville, town of (Carroll County)	Jan. 23, 1974
Total	85

Louisiana

	Date of Identification
Abita Springs, town of (St. Tammany Parish)	May 17, 1974
Albany, Village of (Livingston Parish)	Apr. 12, 1974
Basile, town of (Evangeline Parish)	May 24, 1974
Bastrop, city of (Morehouse Parish)	Mar. 15, 1974
Benton, town of (Bossier Parish)	June 14, 1974
Boyce, town of (Rapides Parish)	Apr. 5, 1974
Broussard, town of (Lafayette Parish)	Apr. 12, 1974
Clarence, village of (Natchitoches Parish)	Mar. 1, 1974
Coushatta, town of (Red River Parish)	Apr. 12, 1974
Denham Springs, city of (Livingston Parish)	Mar. 15, 1974
Doyline, village of (Webster Parish)	Apr. 5, 1974
Duson, town of (Lafayette Parish)	Do.
Grand Coteau, town of (St. Landry Parish)	Dec. 7, 1973
Independence, town of (Tangipahoa Parish)	May 17, 1974
Kinder, town of (Allen Parish)	Apr. 5, 1974
Le Compte, town of (Rapides Parish)	May 17, 1974
Mermentau, town of (Acadia Parish)	Nov. 23, 1974
Morse, town of (Acadia Parish)	Nov. 23, 1973
Pearl River, town of (St. Tammany Parish)	May 24, 1974
Provencal, village of (Natchitoches Parish)	Do.
Ringgold, town of (Bienville Parish)	May 3, 1974
Robeline, village of (Natchitoches Parish)	Apr. 12, 1973
Roseland, town of (Tangipahoa Parish)	Oct. 26, 1973
Sicily Island, Village of (Catahoula Parish)	Dec. 28, 1973
Sterlington, town of (Ouachita Parish)	Dec. 17, 1973

Louisiana—Continued

	Date of Identification
Ville Platte, town of (Evangeline Parish)	May 17, 1974
Winnfield, town of (Winn Parish)	Nov. 16, 1973
Total	27

Maine

	Date of Identification
Ashland, town of (Aroostook County)	June 14, 1974
Buxton, town of (York County)	Apr. 5, 1974
Dexter, town of (Penobscot County)	Mar. 15, 1974
Glenburn, town of (Penobscot County)	Mar. 1, 1974
Hollis, town of (York County)	May 31, 1974
Limington, town of (York County)	Do.
Lisbon, town of (Androscoggin County)	Feb. 15, 1974
Minot, town of (Androscoggin County)	Feb. 1, 1974
Phillips, town of (Franklin County)	June 14, 1974
Poland, town of (Androscoggin County)	Feb. 22, 1974
Richmond, town of (Sagadohoc County)	May 31, 1974
Sabattus, town of (Androscoggin County)	Do.
Scarborough, town of (Cumberland County)	May 17, 1974
South Portland, city of (Cumberland County)	Feb. 22, 1974
Strong, town of (Franklin County)	June 14, 1974
Van Buren, town of (Aroostook County)	Do.
Total	16

Maryland

	Date of Identification
Williamsport, town of (Washington County)	Feb. 15, 1974
Total	1

Massachusetts

	Date of Identification
Amesbury, town of (Essex County)	June 14, 1975
Athol, town of (Worcester County)	Mar. 8, 1974
Barre, town of (Worcester County)	May 17, 1974
Brewster, town of (Barnstable County)	Mar. 15, 1974
Brookfield, town of (Worcester County)	May 3, 1974
Buckland, town of (Franklin County)	May 31, 1974
Chatham, town of (Barnstable County)	Do.
East Brookfield, town of (Worcester County)	June 7, 1974
Edgartown, town of (Dukes County)	May 31, 1974
Everett, city of (Middlesex County)	June 7, 1974
Fitchburg, city of (Worcester County)	Apr. 5, 1974
Gill, town of (Franklin County)	Mar. 15, 1974
Grafton, town of (Worcester County)	Apr. 5, 1974
Holland, town of (Hampden County)	June 7, 1974
Leonminster, town of (Worcester County)	Mar. 22, 1974
Monterey, town of (Berkshire County)	Mar. 15, 1974
Orange, town of (Franklin County)	May 31, 1974
Royalston, town of (Worcester County)	May 17, 1974
Sunderland, town of (Franklin County)	Mar. 8, 1974

Massachusetts—Continued

	Date of Identification
Warren, town of (Worcester County)	May 17, 1974
Westborough, town of (Worcester County)	Mar. 8, 1974
Wilbraham, town of (Hampden County)	May 17, 1974
Total	22

Michigan

	Date of Identification
Almont, village of (Lapeer County)	May 10, 1974
Ash, township of (Monroe County)	June 14, 1974
Bedford, township of (Monroe County)	Feb. 15, 1974
De Witt, city of (Clinton County)	Mar. 8, 1974
Flat Rock, city of (Wayne County)	May 17, 1974
Frankenmuth, city of (Saginaw County)	Jan. 23, 1974
Grand Ledge, city of (Eaton County)	May 17, 1974
Hastings, city of (Barry County)	Apr. 12, 1974
Leslie, city of (Ingham County)	June 14, 1974
Manchester, village of (Washtenaw County)	Feb. 22, 1974
Memphis, village of (St. Clair County)	May 17, 1974
Milan, township of (Monroe County)	May 24, 1974
Olivet, city of (Eaton County)	May 17, 1974
Parchment, city of (Kalamazoo County)	May 10, 1974
Petersburg, town of (Monroe County)	Feb. 15, 1974
Plainwell, city of (Allegan County)	May 17, 1974
Plymouth, city of (Wayne County)	Do.
Raisinville, township of (Monroe County)	Feb. 15, 1974
Riverview, City of (Wayne County)	May 3, 1974
Saugatuck, village of (Allegan County)	June 7, 1974
South Rockwood, village of (Monroe County)	Feb. 1, 1974
Traverse City, city of (Grand Traverse County)	May 24, 1974
Watervliet, city of (Berrien County)	May 31, 1974
Williamston, city of (Ingham County)	May 3, 1974
Total	24

Minnesota

	Date of Identification
Arlington, city of (Sibley County)	May 17, 1974
Aurora, city of (St. Louis County)	Apr. 5, 1974
Avon, city of (Stearns County)	Mar. 29, 1974
Brownton, city of (McLeod County)	May 3, 1974
Chokio, city of (Stevens County)	Do.
Clinton, city of (Big Stone County)	May 17, 1973
Cohasset, city of (Itasca County)	May 31, 1974
Corcoran, city of (Hennepin County)	June 7, 1974
Cosmos, city of (Meeker County)	May 17, 1974
Eagan, city of (Dakota County)	Nov. 30, 1973
Eden Prairie, city of (Hennepin County)	Mar. 1, 1974
Elgin, city of (Wabasha County)	May 17, 1974

Minnesota—Continued	*Date of Identification*
Ellsworth, city of (Nobles County)	May 3, 1974
Elmore, city of (Faribault County)	May 14, 1974
Eveleth, city of (St. Louis County)	June 7, 1974
Eyota, city of (Olmsted County)	Apr. 12, 1974
Fairfax, city of (Renville County)	Mar. 29, 1974
Fairmont, city of (Martin County)	June 7, 1974
Farmington, village of (Dakota County)	May 24, 1974
Freeport, city of (Stearns County)	May 3, 1974
Glenwood, city of (Pope County)	Mar. 29, 1974
Glyndon, city of (Clay County)	May 17, 1974
Goodhue, city of (Goodhue County)	May 24, 1974
Graceville, city of (Big Stone County)	May 17, 1974
Greenwood, city of (Hennepin County)	May 31, 1974
Henning, city of (Otter Tail County)	May 3, 1974
Heron Lake, city of (Jackson County)	May 24, 1974
Hills, city of (Rock County)	Apr. 12, 1974
Holdingford, city of (Stearns County)	May 17, 1974
International Falls, city of (Koochiching County)	June 7, 1974
Isanti, city of (Isanti County)	Jan. 9, 1974
Ivanhoe, city of (Lincoln County)	Mar. 29, 1974
Jasper, city of (Pipestone and Rock Counties)	Do.
Keewatin, city of (Itasca County)	May 3, 1974
Kenyon, city of (Goodhue County)	May 24, 1974
Kiester, city of (Faribault County)	May 10, 1974
Litchfield, city of (Meeker County)	Apr. 12, 1974
Madelia, city of (Watonwan County)	Do
Madison, city of (Lac Qui Parle County)	Do.
Maple Plain, city of (Hennepin County)	May 3, 1974
Marble, city of (Itasca County)	May 17, 1974
Mayer, city of (Carver County)	Nov. 23, 1973
Medford, city of (Steele County)	Apr. 12, 1974
Menahga, city of (Wadena County)	Do.
Mendota Heights, city of (Dakota County)	Nov. 23, 1973
Mendota, city of (Dakota County)	Feb. 8, 1974
Minnesota Lake, city of (Faribault County)	May 17, 1974
Morristown, city of (Rice County)	Mar. 29, 1974
Mounds View, city of (Ramsey County)	May 3, 1974
Mountain Iron, village of (St. Louis County)	May 24, 1974
New London, city of (Kandiyohi County)	Apr. 5, 1974
New Richland, city of (Waseca County)	Apr. 12, 1974
Nicollet, city of (Nicollet County)	Apr. 5, 1974
North Branch, city of (Chicago County)	May 10, 1974
Oak Park Heights, city of (Washington County)	Mar. 22, 1974
Odessa, city of (Big Stone County)	Nov. 23, 1973
Ravenna, city of (Dakota County)	Feb. 25, 1974
Richmond, city of (Stearns County)	Mar. 29, 1974
Rosemont, city of (Dakota County)	June 7, 1974
Rush City, city of (Chisago County)	May 10, 1974
Sacred Heart, city of (Renville County)	May 3, 1974
Sanborn, city of (Redwood County)	May 10, 1974
Scanlon, city of (Carlton County)	Nov. 2, 1973
Sebeka, city of (Wadena County)	Apr. 12, 1974
Spring Lake Park, city of (Anoka County)	May 10, 1974
Spring Park, city of (Hennepin County)	June 7, 1974
St. Bonifacius, city of (Hennepin County)	Do.
Taylor Falls, city of (Chisago County)	May 24, 1974
Tyler, city of (Lincoln County)	May 3, 1974
Wanamingo, city of (Goodhue County)	May 10, 1974
Watkins, city of (Meeker County)	Apr. 12, 1974
Welcome, city of (Martin County)	May 10, 1974
Winthrop, city of (Sibley County)	May 17, 1974
Total	73

Mississippi

Crowder, town of (Quitman and Panola Counties)	June 7, 1974
Marion, town of (Lauderdale County)	Jan. 16, 1974
Ripley, city of (Tippah County)	June 7, 1974
Shubuta, town of (Clarke County)	Do.
Vaiden, town of (Carroll County)	Do.
Waynesboro, town of (Wayne County)	Jan. 23, 1974
Total	6

Missouri

Anderson, city of (McDonald County)	May 17, 1974
Anniston, town of (Mississippi County)	May 3, 1974
Arcadia, town of (Iron County)	Dec. 28, 1973
Archie, town of (Cass County)	June 7, 1974
Ava, city of (Douglas County)	May 17, 1974
Ballwin, city of (St. Louis County)	June 7, 1974
Bland, city of (Gasconade County)	May 17, 1974
Bloomfield, city of (Stoddard County)	Dec. 28, 1973
Bolivar, city of (Polk County)	Mar. 15, 1974
Breckenridge Hills, city of (St. Louis County)	Dec. 7, 1973
Brookfield, city of (Linn County)	Feb. 1, 1974
Brunswick, town of (Chariton County)	Mar. 29, 1974
Buckner, town of (Jackson County)	Dec. 28, 1973
California, city of (Moniteau County)	Apr. 5, 1974
Cameron, city of (Clinton and Dekalb Counties)	May 17, 1974

Missouri—Continued	*Date of Identification*
Campbell, city of (Dunklin County)	Mar. 29, 1974
Carl Junction, city of (Jasper County)	Feb. 8, 1974
Carrollton, city of (Carroll County)	Jan. 9, 1974
Carterville, town of (Jasper County)	Dec. 28, 1973
Carthage, city of (Jasper County)	Mar. 15, 1974
Center, town of (Ralls County)	July 26, 1973
Clinton, city of (Henry County)	Apr. 12, 1974
Conway, town of (Laclede County)	May 10, 1974
Crane, city of (Stone County)	June 7, 1974
Doniphan, city of (Ripley County)	Mar. 1, 1974
Duenweg, city of (Jasper County)	May 3, 1974
Eldorado Springs, city of (Cedar County)	Dec. 28, 1973
Elvins, city of (St. Francois County)	Dec. 17, 1973
Fairfax, town of (Atchinson County)	May 10, 1974
Fisk, City of (Butler County)	Mar. 29, 1974
Fulton, city of (Callaway County)	May 17, 1974
Gainesville, town of (Oxsark County)	Dec. 28, 1973
Garden City, town of (Cass County)	Mar. 29, 1974
Glenaire, village of (Clay County)	June 14, 1974
Granby, city of (Newton County)	Apr. 12, 1974
Hardin, city of (Ray County)	June 7, 1974
Harrisonville, city of (Cass County)	Mar. 15, 1974
Hillsdale, village of (St. Louis County)	Apr. 5, 1974
Illmo, city of (Scott County)	May 3, 1974
Kinloch, city of (St. Louis County)	Jan. 9, 1974
Laddonia, city of (Audrain County)	May 24, 1974
Lamar, town of (Barton County)	Dec. 28, 1973
Lilbourn, city of (New Madrid County)	May 17, 1974
Lincoln, town of (Benton County)	May 31, 1974
Lutesville, city of (Bollinger County)	May 10, 1974
Manchester, city of (St. Louis County)	Dec. 17, 1973
Marble Hill, city of (Bollinger County)	May 10, 1974
Marceline, city of (Linn County)	Mar. 29, 1974
Marionville, city of (Lawrence County)	May 17, 1974
Marlborough, village of (St. Louis County)	May 31, 1974
Marston, city of (New Madrid County)	May 24, 1974
Mary Ridge, village of (St. Louis County)	Apr. 5, 1974
Milan, city of (Sullivan County)	Mar. 1, 1974
Naylor, city of (Ripley County)	Do.
Noel, town of (McDonald County)	May 24, 1974
Norborne, city of (Carroll County)	Apr. 5, 1974
Owensville, city of (Gasconade County)	May 10, 1974

Missouri—Continued

	Date of Identification
Ozark, city of (Christian County)	Dec. 28, 1973
Palmyra, city of (Marion County)	Mar. 6, 1974
Parkville, town of (Platte County)	Jan. 16, 1974
Parma, town of (New Madrid County)	Mar. 29, 1974
Perryville, city of (Perry County)	Mar. 8, 1974
Poplar Bluff, city of (Butler County)	Do.
Puxico, town of (Stoddard County)	Do.
Scott City, city of (Scott County)	Apr. 12, 1974
Slater, city of (Saline County)	May 10, 1974
Stanberry, city of (Gentry County)	May 17, 1974
St. Clair, town of (Franklin County)	Apr. 12, 1974
Town & Country, city of (St. Louis County)	Dec. 28, 1973
Trenton, City of (Grundy County)	Feb. 15, 1974
Van Buren, town of (Carter County)	Jan. 23, 1974
Vandalia, city of (Audrain County)	May 17, 1974
Versailles, city of (Morgan County)	Apr. 5, 1974
Vinita Park, city of (St. Louis County	Do.
Warrensburg, city of (Johnson County)	Dec. 17, 1973
Warsaw, city of (Benton County)	Mar. 29, 1974
Windsor, city of (Henry County)	Apr. 5, 1974
Total	77

Montana

Baker, city of (Fallon County)	Mar. 16, 1974
Big Sandy, town of (Chouteau County)	Mar. 29, 1974
Choteau, city of (Teton County)	Mar. 22, 1974
Darby, town of (Ravalli County)	Jan. 9, 1974
Ennis, town of (Madison County)	Mar. 15, 1974
Forsyth, city of (Rosebud County)	
Fort Benton, city of (Chouteau County)	Mar. 8, 1974 May 10, 1974
Glasgow, city of (Valley County)	Jan. 9, 1974
Hot Springs, town of (Sanders County)	June 7, 1974
Kalispell, city of (Flathead County)	Feb. 15, 1974
Libby, city of (Lincoln County)	May 31, 1974
Nashua, town of (Valley County)	Apr. 5, 1974
Plains, town of (Sanders County)	Mar. 22, 1974
Red Lodge, City of (Carbon County)	May 24, 1974
Three Forks, town of (Galla-	
Twin Bridges, town of (Madison County)	Mar. 29, 1974
tin County)	Do.
son County)	
White Sulphur Springs, city of (Meager County)	May 24, 1974
Whitefish, city of (Flathead County)	May 31, 1974
Total	18

Nebraska

	Date of Identification
Auburn, city of (Nemaha County)	Dec. 17, 1973
Bennington, village of (Douglas County)	Feb. 1, 1973
Blue Springs, city of (Gage County)	Jan. 9, 1974
Brule, village of (Keith County)	May 24, 1974
Cairo, town of (Hall County)	Do.
Clay Center, city of (Clay County)	Mar. 22, 1974
Culberton, village of (Hitchcock County)	May 10, 1974
Edgar, city of (Clay County)	Apr. 12, 1974
Elm Creek, village of (Buffalo County)	May 31, 1974
Ewing, village of (Holt County)	May 3, 1974
Fullerton, city of (Nance County)	June 7, 1974
Gibbon, city of (Buffalo County)	May 31, 1974
Harvard, city of (Clay County)	Mar. 22, 1974
Hay Springs, city of (Sheridan County)	Do.
Nickerson, town of (Dodge County)	Jan. 23, 1974
Oakdale, village of (Antelope County)	Dec. 28, 1973
Ord, town of (Valley County)	Apr. 5, 1974
Osceola, city of (Polk County)	Mar. 22, 1974
Overton, village of (Dawson County)	June 14, 1974
O'Neill, city of (Holt County)	Jan. 23, 1974
Paxton, Village of (Keith County)	May 24, 1974
Ponca, City of (Dixon County)	Apr. 12, 1974
Ralston, city of (Douglas County)	Jan. 23, 1974
Rushville, city of (Sheridan County)	May 3, 1974
Shelton, village of (Buffalo County)	Mar. 22, 1974
Stromsburg, city of (Polk County)	June 7, 1974
Sutton, city of (Clay County)	Do.
Terrtown, village of (Scotts Bluff County)	Dec. 17, 1973
Wisner, town of (Cuming County)	Dec. 7, 1973
Total	29

Nevada

Caliente, city of (Lincoln County)	Mar. 29, 1974
Carson City, city of (Carson City County)	May 24, 1974
Sparks, city of (Washoe County)	Feb. 8, 1974
Total	3

New Hampshire

	Date of Identification
Allenstown, town of (Merrimack County)	Apr. 5, 1974
Bath, town of (Grafton County)	Mar. 1, 1974
Bedford, Town of (Hillsborough County)	Mar. 29, 1974
Bennington, town of (Hillsborough County)	Mar. 8, 1974
Boscawen, town of (Merrimack County)	Mar. 15, 1974
Campton, town of (Grafton County)	Apr. 5, 1974
Charlestown, town of (Sullivan County)	May 31, 1974
Chichester, town of (Merrimack County)	Apr. 5, 1974
Derring, town of (Hillsborough County)	Mar. 15, 1974
Epsom, town of (Merrimack County)	Do.
Francestown, town of (Hillsborough County)	June 14, 1974
Franklin, city of (Merrimack County)	Mar. 8, 1974
Gilsum, town of (Cheshire County)	May 31, 1974
Gorham, town of (Coos County)	Mar. 1, 1974
Haverhill, town of (Grafton County)	Mar. 8, 1974
Hennicker, town of (Merrimack County)	Mar. 15, 1974
Holderness, town of (Grafton County)	Mar. 22, 1974
Hudson, Town of (Hillsborough County)	Mar. 8, 1974
Litchfield, town of (Hillsborough County)	Mar. 15, 1974
Littleton, town of (Grafton County)	May 31, 1974
Meredith, town of (Belknap County)	June 14, 1974
New Castle, town of (Rockingham County)	May 31, 1974
New Hampton, town of (Belknap County)	Mar. 8, 1974
Northfield, town of (Merrimack County)	Mar. 22, 1974
Northumberland, town of (Coos County)	Feb. 22, 1974
Pembroke, town of (Merrimack County)	May 3, 1974
Pittsfield, town of Merrimack County)	Mar. 15, 1974
Plymouth, town of (Grafton County)	May 3, 1974
Rumney, town of (Grafton County)	Mar. 15, 1974
Tilton, town of (Belknap County)	Mar. 22, 1974
Unity, town of (Sullivan County)	May 31, 1974
Total	31

New Jersey

Audubon, borough of (Camden County)	Mar. 29, 1974
Bayonne, city of (Hudson County)	May 17, 1974
Bogota, borough of (Bergen County)	May 31, 1974
Bradley Beach, borough of (Monmouth County)	Dec. 28, 1973
Butler, borough of (Morris County)	Feb. 1, 1974
Colts Neck, township of (Monmouth County)	Apr. 12, 1974
Fairview, borough of (Bergen County)	Feb. 1, 1974
Franklin, borough of (Sussex County)	May 17, 1974
Hamburg, borough of (Sussex County)	June 14, 1974
Hampton, borough of (Hunterdon County)	June 7, 1974
Hasbrouck Heights, borough of (Bergen County)	Nov. 30, 1973
Kinnelon, borough of (Morris County)	July 13, 1974
Little Ferry, borough of (Bergen County)	Dec. 28, 1973
Maple Shade, township of (Burlington County)	Mar. 15, 1974
Morristown, town of (Morris County)	Feb. 1, 1974

New Jersey—Continued

	Date of Identification
North Arlington, borough of (Bergen County)	Mar. 29, 1974
Oaklyn, borough of (Camden County)	Feb. 22, 1974
Ogdensburg, borough of (Sussex County)	May 17, 1974
Pitman, borough of Gloucester County)	Mar. 15, 1974
Prospect Park, borough of (Passaic County)	May 3, 1974
Red Bank, borough of (Monmouth County)	Mar. 8, 1974
Roseland, borough of (Essex County)	June 29, 1973
Rutherford, borough of (Bergen County)	Apr. 12, 1974
Seaside Heights, borough of (Ocean County)	Mar. 22, 1974
Shrewsbury, borough of (Monmouth County)	June 7, 1974
Susex, borough of (Sussex County)	June 14, 1974
Upper Freehold, township of (Monmouth County)	Mar. 22, 1974
West New York, town of (Hudson County)	May 31, 1974
Westville, borough of (Gloucester County)	Mar. 8, 1974
Winfield, township of (Union County)	Do.
Woodcliff Lake, borough of (Bergen County)	Feb. 22, 1974
Total	31

New Mexico

Cimarron, village of (Colfax County)	May 17, 1974
Hagerman, town of (Chaves County)	May 31, 1974
Silver City, town of (Grant County)	June 14, 1974
Taos, town of (Taos County).	May 17, 1974
Total	4

New York

Adams, town of (Jefferson County)	May 31, 1974
Alabama, town of (Genesee County)	May 3, 1974
Albion, village of (Orleans County)	May 24, 1974
Alexandria, town of (Jefferson County)	May 31, 1974
Antwerp, village of (Jefferson County)	Do.
Arcade, village of (Wyoming County)	Do.
Baldwin, town of (Chemung County)	Do.
Ballston Spa, village of (Saratoga County)	Do.
Barker, town of (Broome County)	Feb. 15, 1974
Batavia, town of (Genesee County)	May 3, 1974
Baxter Estates, village of (Nassau County)	June 14, 1974
Bolivar, village of (Allegany County)	May 17, 1974
Boonville, village of (Oneida County)	May 31, 1974
Boston, town of (Erie County)	Apr. 12, 1974
Brant, town of (Erie County)	June 14, 1974
Bridgewater, village of (Oneida County)	May 17, 1974
Brockport, village of (Monroe County)	May 31, 1974
Cambria, town of (Niagara County)	Apr. 12, 1974
Canaseraga, village of (Allegany County)	May 10, 1974
Canastota, village of (Madison County)	Mar. 29, 1974

New Mexico—Continued

	Date of Identification
Candor, village of (Tioga County)	May 31, 1974
Castleton on the Hudson, village of (Rensselaer County)	Mar. 1, 1974
Celoron, village of (Chautauqua County)	Feb. 15, 1974
Central Square, village of (Oswego County)	May 17, 1974
Champion, town of (Jefferson County)	May 31, 1974
Champlain, village of (Clinton County)	Do.
Chaumont, village of (Jefferson County)	May 17, 1974
Chenango, town of (Broome County)	Mar. 8, 1974
Cherry Creek, village of (Chautauqua County)	May 10, 1974
Cincinnatus, town of (Cortland County)	Apr. 5, 1974
Claytton, town of (Jefferson County)	June 14, 1974
Clayville, village of (Oneida County)	May 24, 1974
Cleveland, village of (Oswego County)	May 31, 1974
Clyde, village of (Wayne County)	Do.
Cold Spring, village of (Putnam County)	Mar. 8, 1974
Columbia, town of (Herkimer County)	Mar. 29, 1974
Constantia, town of (Oswego County)	Apr. 5, 1974
Croghan, village of (Lewis County)	May 31, 1974
Danube, town of (Herkimer County)	Apr. 5, 1974
De Ruyter, village of (Madison County)	May 24, 1974
Dickinson, town of (Broome County)	Mar. 8, 1974
Dobbs Perry, village of (Westchester County)	May 17, 1974
Earlville, village of (Madison County)	May 31, 1974
East Syracuse, village of (Onondaga County)	Apr. 12, 1974
Eaton, town of (Madison County)	May 3, 1974
Elmsford, village of (Westchester County)	Apr. 12, 1974
Evans Mills, village of (Jefferson County)	May 17, 1974
Fairfield, town of (Herkimer County)	Mar. 29, 1974
Falconer, village of (Chautauqua County)	Feb. 22, 1974
Filmore, village of (Allegany County)	Feb. 1, 1974
Florida, village of Orange County)	Mar. 22, 1974
Fonda, village of (Montgomery County)	Mar. 1, 1974
Fort Ann, village of (Washington County)	Apr. 12, 1974
Fort Johnson, village of (Montgomery County)	Mar. 15, 1974
Franklinville, village of (Cattaraugus County)	May 31, 1974
Franklin, village of (Delaware County)	Do.
Freedom, town of (Cattaraugus County)	Do.
Freeville, village of (Tompkin County)	Do.
Galway, town of (Saratoga County)	June 14, 1974
Glen Park, village of (Jefferson County)	Mar. 29, 1974
Gouverneur, village of (St. Lawrence County)	May 24, 1974
Granby, town of (Oswego County)	May 3, 1974

New Mexico—Continued

	Date of Identification
Greene, village of (Chenango County)	Apr. 12, 1974
Groton, village of (Tompkins County)	Do.
Hamilton, town of (Madison County)	May 31, 1974
Harriman, village of (Orange County)	Mar. 8, 1974
Haverstraw, village of (Rockland County)	Apr. 12, 1974
Hobart, village of (Delaware County)	May 24, 1974
Holland, town of (Erie County)	June 14, 1974
Hudson Falls, village of (Washington County)	May 31, 1974
Ischua, town of (Cattaraugus County)	Do.
Keeseville, village of (Essex County)	Do.
Kensington, village of (Nassau County)	June 14, 1974
Lebanon, town of (Madison County)	May 31, 1974
Lenox, town of (Madison County)	May 10, 1974
Leon, town of (Cattaraugus County)	May 31, 1974
Limestone, village of (Cataraugua County)	May 17, 1974
Lincoln, town of (Madison County)	Apr. 12, 1974
Lisle, town of (Broome County)	Feb. 15, 1974
Litchfield, town of (Herkimer County)	Mar. 15, 1974
Little Falls, town of (Herkimer County)	Apr. 5, 1974
Little Valley, village of (Cataraugus County)	May 31, 1974
Livingston, town of (Columbia County)	May 24, 1974
Lorraine, town of (Jefferson County)	May 10, 1974
Lyons, village of (Wayne County)	May 3, 1974
Manheim, town of (Herkimer County)	Mar. 8, 1974
Mansfield, town of (Cataraugus County)	May 31, 1974
Marilla, town of (Erie County)	May 17, 1974
Mechanicville, city of (Saratoga County)	Apr. 5, 1974
Medina, village of (Orleans County)	May 24, 1974
Middleburg, village of (Schoharie County)	May 31, 1974
Milton, town of (Saratoga County)	June 14, 1974
Minisink, town of (Orange County)	Apr. 12, 1974
Mohawk, town of (Montgomery County)	Feb. 15, 1974
Montezuma, town of (Cayuga County)	May 31, 1974
Montgomery, town of (Orange County)	Mar. 22, 1974
Moravia, town of (Cayuga County)	June 14, 1974
Moravia, village of (Cayuga County)	May 3, 1974
Morristown, village of (St. Lawrence County)	May 31, 1974
Morrisville, village of (Madison County)	Mar. 8, 1974
Mount Hope, town of (Orange County)	May 24, 1974
Manticoke, town of (Broome County)	Apr. 12, 1974
Napoli, town of (Cataraugus County)	June 14, 1974
Nassau, village of (Rensselaer County)	Mar. 22, 1974

New Mexico—Continued

	Date of Identification
Nelliston, village of (Montgomery County)	Feb. 15, 1974
New Berlin, village of (Chenango County)	May 31, 1974
New Lebanon, town of (Columbia County)	Apr. 12, 1974
New Scotland, township of (Albany County)	May 10, 1974
Newstead, town of (Erie County)	Apr. 12, 1974
Nichols, village of (Tioga County)	June 7, 1974
North Syracuse, village of (Onondaga County)	Do.
Olive, town of (Ulster County)	Do.
Orchard Park, village of (Erie County)	Do.
Oswego, town of (Oswego County)	May 31, 1974
Otisco, town of (Onondaga County)	Do.
Otto, town of (Cataraugus County)	Do.
Owasco, town of (Cayuga County)	Do.
Palatine Bridge, village of (Montgomery County)	Feb. 15, 1974
Peekskill, city of (Westchester County)	May 31, 1974
Pelham, village of (Westchester County)	May 17, 1974
Perrysburg, town of (Cattaraugus County)	May 17, 1974
Perry, village of (Wyoming County)	May 24, 1974
Poland, village of (Herkimer County)	Mar. 8, 1974
Port Byron, village of (Cayuga County)	May 3, 1974
Putnam Valley, town of (Putnam County)	Mar. 29, 1974
Richmondville, village of (Schoharie County)	May 31, 1974
Rosendale, town of (Ulster County)	Do.
Round Lake, village of (Saratoga County)	Do.
Rouses Point, village of (Clinton County)	June 14, 1974
Rutland, town of (Jefferson County)	June 7, 1974
Saddle Rock, village of (Nassau County)	June 14, 1974
Salem, village of (Washington County)	Apr. 12, 1974
Salisbury, town of (Herkimer County)	June 7, 1974
Sandy Creek, town of (Oswego County)	May 24, 1974
Schaghticoke, village of (Rensselaer County)	May 31, 1974
Schoharie, village of (Schoharie County)	Do.
Schuylerville, village of (Saratoga County)	Mar. 29, 1974
Scottsville, village of (Monroe County)	Mar. 8. 1974
Sempronius, town of (Cayuga County)	May 31, 1974
Sennett, town of (Cayuga County)	June 14, 1974
Sherburne, village of (Chenango County)	May 31, 1974
Sidney, town of (Delaware County)	Apr. 12, 1974
Sidney, village of (Delaware County)	Feb. 8, 1974
Sinclairville, village of (Chautauqua County)	May 10, 1974
Sloatsburg, village of (Rockland county)	Mar. 22, 1974
South Dayton, village of (Cattaraugus County)	May 31, 1974
South Glens Falls, village of (Saratoga County)	Apr. 12, 1974
South Nyack, village of (Rockland County)	Mar. 15, 1974
Springville, village of (Erie County)	May 17, 1974
Stamford, village of (Delaware County)	Do.
Summerhill, town of (Cayuga County)	May 31, 1974
Tannersville, village of (Greene County)	June 7, 1974
Theresa, village of (Jefferson County)	May 10, 1974
Throop, town of (Cayuga County)	Apr. 12, 1974
Torrey, town of (Yates County)	May 31, 1974
Triangle, town of (Broome County)	Apr. 5, 1974
Truxton, town of (Cortland County)	Do.
Tuckahoe, village of (Westchester County)	May 10, 1974
Turin, town of (Lewis County)	June 7, 1974
Upper Nyack, village of (Rockland County)	Mar 15, 1974
Victory, village of (Saratoga County)	Apr. 5, 1974
Wales, town of (Erie County)	May 10, 1974
Waterloo, village of (Seneca County)	May 31, 1974
Watertown, city of (Jefferson County)	Apr. 5, 1974
Watertown, town of (Jefferson County)	Do.
West Carthage, village of (Jefferson County)	May 10, 1974
Whitney Point, village of (Broome County)	Feb. 22, 1974
Wilton, town of (Saratoga County)	June 14, 1974
Wyoming, village of (Wyoming County)	May 17, 1974
Total	169

North Carolina

	Date of Identification
Andrews, city of (Cherokee County)	Mar. 8, 1974
Bladenboro, town of (Bladen County)	Nov. 30, 1974
Burnsville, city of (Yancey County)	Mar. 8, 1974
Carrboro, village of (Orange County)	Feb. 22, 1974
Chadbourn, town of (Columbus County)	May 24, 1974
China Grove, town of (Rowan County)	Jan. 9, 1974
Columbia, town of (Tyrell County)	Feb. 8, 1974
Conetoe, town of (Edgecombe County)	Jan. 9, 1974
Dillsboro, city of (Jackson County)	Mar. 8, 1974
Elizabethtown, town of (Bladen County)	Dec. 28, 1973
Enfield, town of (Halifax County)	Nov. 30, 1973
Franklinville, town of (Randolph County)	Feb. 22, 1974
Gatesville, town of (Gates County)	Do.
Jonesville, town of (Yadkin County)	Mar. 1, 1974
Knightdale, town of (Wake County)	Apr. 12, 1974
Lake Waccamaw, town of (Columbus County)	Dec. 28, 1973
Lansing, town of (Ashe County)	Feb. 22, 1974
Lincolnton, city of (Lincoln County)	Apr. 5, 1974
Macclesfield, town of (Edgecombe County)	Jan. 9, 1974
Newland, town of (Avery County)	June 14, 1974
Pinetops, town of (Edgecombe County)	Jan. 9, 1974
Robbinsville, town of (Graham County)	June 14, 1974
Robersonville, town of (Martin County)	June 7, 1974
Rutherfordton, town of (Rutherford County)	Mar. 1, 1974
Sparta, city of (Alleghany County)	Feb. 15, 1974
Speed, town of (Edgecombe County)	Jan. 9, 1974
Spruce Pine, town of (Mitchell County)	June 14, 1974
Sylva, city of (Jackson County)	Mar. 8, 1974
Vanceboro, town of (Craven County)	Mar. 1, 1974
Waynesville, city of (Haywood County)	Mar. 8, 1974
Whitakers, town of (Edgecomb County)	May 24, 1974
Total	31

North Dakota

	Date of Identification
Belfield, city of (Stark County)	May 24, 1974
Bowman, city of (Bowman County)	Mar. 29, 1974
Hatton, city of (Trail County)	May 10, 1974
Lakota, city of (Nelson County)	May 3, 1974
Leeds, city of (Benson County)	Apr. 5, 1974
Maddock, city of (Benson County)	Mar. 8, 1974 & Nov. 15, 1973
New Rockford, city of (Eddy County)	Nov. 23, 1973
Portland, city of (Trail County)	May 10, 1974
Rugby, city of (Pierce County)	Mar. 22, 1974
Turtle Lake, city of (McLean County)	Do.
Washburn, city of (McLean County)	Do.
Wilton, city of (McLean and Burleigh Counties)	May 24, 1974
Total	12

Ohio

	Date of Identification
Ada, city of (Hardin County)	June 7, 1974
Addyston, village of (Hamilton County)	Mar. 1, 1974
Alexandria, village of (Licking County)	May 31, 1974
Alliance, city of (Stark County)	June 7, 1974
Amsterdam, village of (Jefferson County)	Apr. 12, 1974
Antwerp, village of (Paulding County)	Mar. 29, 1974
Apple Creek, village of Wayne County)	Do.
Arlington Heights, village of (Hamilton County)	Feb. 1, 1974
Arlington, village of (Hancock County)	May 17, 1974
Ashley, village of (Delaware County)	Jan. 23, 1974
Aurora, city of (Portage County)	May 10, 1974
Avon, city of (Lorain County)	Apr. 12, 1974
Bainbridge, village of (Ross County)	Mar. 29, 1974
Barnesville, village of (Belmont County)	June 7, 1974
Batavia, village of (Clermont County)	Nov. 30, 1973

Ohio—Continued

	Date of Identification
Bedford, city of (Cuyahoga County)	Feb. 8, 1974
Bellaire, city of (Belmont County)	Do.
Berlin Heights, village of (Erie County)	Apr. 5, 1974
Bettsville, village of (Seneca County)	Apr. 12, 1974
Blanchester, village of (Clinton County)	Apr. 5, 1974
Botkins, village of (Shelby County)	May 31, 1974
Brecksville, city of (Cuyahoga County)	Feb. 8, 1974
Brooklyn, city of (Cuyahoga County)	Mar. 22, 1974
Dennison, village of (Tusgomery County)	Feb. 15, 1974
Bryan, city of (Williams County)	June 7, 1974
Cadiz, village of (Harrison County)	May 31, 1974
Caldwell, village of (Noble County)	June 7, 1974
Caledonia, village of (Marion County)	Apr. 5, 1974
Cambridge, city of (Guernsey County)	May 31, 1974
Camden, village of (Preble County)	May 10, 1974
Canfield, village of (Mahoning County)	May 17, 1974
Castalia, village of (Erie County)	Mar. 29, 1974
Centerburg, village of (Knox County)	May 17, 1974
Chagrin Falls, village of (Cuyahoga County)	Mar. 15, 1974
Chardon, village of (Geauga County)	Jan. 9, 1974
Cheviot, city of (Hamilton County)	June 7, 1974
Christiansburg, village of (Champaign County)	Feb. 1, 1974
Coal Grove, village of (Lawrence County)	June 14, 1974
Coalton, village of (Jackson County)	Feb. 1, 1974
Coldwater, village of (Mercer County)	June 7, 1974
Columbiana, village of (Columbiana County)	May 3, 1974
Columbus Grove, village of (Putnam County)	Feb. 8, 1974
Convoy, village of (Van Wert County)	May 31, 1974
Corning, village of (Perry County)	May 10, 1974
Coshocton, city of (Coshocton County)	Jan. 23, 1974
Covington, village of (Miami County)	June 7, 1974
Creston, village of (Wayne County)	Feb. 1, 1974
Crooksville, village of (Perry County)	Do.
Cuyahoga Heights, village of (Cuyahoga County)	Mar. 29, 1974
Cygnet, village of (Wood County)	May 10, 1974
Delphos, city of (Allen County)	May 17, 1974
Dennison, village of (Tuscarawas County)	Mar. 15, 1974
Donnelsville, village of (Clark County)	Feb. 1, 1974
East Liverpool, city of (Columbiana County)	Jan. 16, 1974
East Palestine, city of (Columbiana County)	Do.
East Sparta, village of (Stark County)	Apr. 5, 1974
Elida, village of (Allen County)	Mar. 29, 1974
Empire, village of (Jefferson County)	Mar. 15, 1974
Euclid, city of (Cuyahoga County)	Apr. 5, 1974
Evendale, village of (Hamilton County)	Mar. 1, 1974
Fairlawn, city of (Summit County)	Mar. 29, 1974
Fort Jennings, village of (Putnam County)	May 31, 1974
Fort Recovery, village of (Mercer County)	June 7, 1974
Frankfort, village of (Ross County)	Apr. 12, 1974
Fredrickstown, village of (Knox County)	April 5, 1974
Galion, city of (Crawford County)	Mar. 15, 1974
Garfield Heights, city of (Cuyahoga County)	Apr. 15, 1974
Garretsville, village of (Portage County)	Apr. 12, 1974
Girard, city of (Trumbull County)	Jan. 23, 1974
Gloria Glens Park, Village of (Medina County)	Mar. 15, 1974
Glouster, village of (Athens County)	May 17, 1974
Grand River, village of (Lake County)	Feb. 8, 1974
Green Camp, village of (Marion County)	Nov. 16, 1973
Green Springs, village of (Sandusky County)	Mar. 1, 1974
Greenfield, village of (Highland County)	Do.
Hamden, village of (Vinton County)	Feb. 1, 1974
Hambler, Village of (Henry County)	Apr. 12, 1974
Harrison, village of (Hamilton County)	Feb. 15, 1974
Hebron, village of (Licking County)	May 3, 1974
Hicksville, village of (Defiance County)	May 17, 1974
Hillsboro, city of (Highland County)	Do.
Holgate, village of (Henry County)	May 3, 1974
Independence, city of (Cuyahoga County)	Feb. 1, 1974
Jackson Center, village of (Shelby County)	May 31, 1974
Jacksonville, village of (Athens County)	May 17, 1974
Jackson, city of (Jackson County)	Do.
Jeffersonville, village of (Fayette County)	Do.
Jeromesville, village of (Ashland County)	May 3, 1974
Kalida, village of (Putnam County)	Mar. 1, 1974
Kenton, city of (Hardin County)	Jan. 9, 1974
Killbuck, village of (Holmes County)	May 3, 1974
Lakemore, village of (Summit County)	Feb. 8, 1974
Lancaster, City of (Fairfield County)	May 17, 1974
Leesburg, village of (Highland County)	Apr. 5, 1974
Leetonia, village of (Columbiana County)	May 3, 1974
Lincoln Heights, village of (Hamilton County)	Feb. 1, 1974
Lisbon, village of (Columbiana County)	Apr. 12, 1974
Lockland, city of (Columbiana County)	Do.
Lodi, village of (Medina County)	Mar. 15, 1974
Logan, city of (Hocking County)	May 31, 1974
London, City of (Madison County)	May 10, 1974
Loudonville, village of (Ashland County)	May 31, 1974
Louisville, city of (Stark County)	May 17, 1974
Lowellville, village of (Mahoning County)	Apr. 5, 1974
Lucas, village of (Richland County)	Do.
Lynchburg, village of (Highland County)	Mar. 29, 1974
Madison, Village of (Lake County)	May 10, 1974
Magnolia, village of (Carroll County)	May 3, 1974
Mantua, village of (Portage County)	Feb. 8, 1974
Maple Heights, City of (Cuyahoga County)	Do.
Mariemont, village of (Washington County)	Do.
Maumee, city of (Lucas County)	Do.
McComb, village of (Hancock County)	May 10, 1974
McConnelsville, village of (Morgan County)	May 17, 1974
McDonald, village of (Trumbull County)	Do.
McGuffey, village of (Hardin County)	May 10, 1974
Mechanicsburg, village of (Champaign County)	Feb. 1, 1974
Mendon, village of (Mercer County)	June 14, 1974
Milan, village of (Erie County)	Apr. 12, 1974
Milbury, village of (Wood County)	Mar. 1, 1974
Millville, village of (Butler County)	June 7, 1974
Monroeville, village of (Huron County)	Nov. 2, 1973
Monroe, village of (Butler County)	May 17, 1974
Montpelier, village of (Williams County)	May 31, 1974
Moraine, Village of (Montgomery County)	Mar. 1, 1974
Moreland Hills, village of (Cuyahoga County)	Feb. 8, 1974
Mount Healthy, city of (Hamilton County)	June 7, 1974
Napoleon, city of (Henry County)	May 31, 1974
Nelsonville, village of (Athens County)	May 10, 1974
New Holland, village of (Pickaway County)	Apr. 5, 1974
New Lexington, village of (Perry County)	May 17, 1974
New Matamoras, village of (Washington County)	Apr. 5, 1974
New Miami, village of (Butler County)	Feb. 8, 1974
New Philadelphia, city of (Tuscarawas County)	Mar. 15, 1974
Newburgh Heights, village of (Cuyahoga County)	Do.
Newcomerstown, village of (Tuscarawas County)	May 17, 1974
Newton, village of (Hamilton County)	Feb. 1, 1974
North Bend, village of (Hamilton County)	Mar. 15, 1974
North Fairfield, village of (Huron County)	Do.
North Ridgeville, city of (Lorain County)	June 7, 1974
Norton, city of (Summit County)	Mar. 15, 1974
Oak Harbor, village of (Ottawa County)	Mar. 1, 1974

Ohio—Continued

	Date of Identification
Oakwood Village, village of (Cuyahoga County)	May 17, 1974
Oakwood, village of (Paulding County)	Do.
Obetz, village of (Franklin County)	Feb. 15, 1974
Ontario, village of (Richland County)	Apr. 5, 1974
Ottawa Hills, village of (Lucas County)	Nov. 9, 1973
Payne, village of (Paulding County)	May 3, 1974
Peninsula, village of (Summit County)	Mar. 22, 1974
Perrysburg, city of (Wood County)	Do.
Piketon, village of (Pike County)	Nov. 23, 1974
Pioneer, village of (Williams County)	May 31, 1974
Plymouth, village of (Huron County)	May 3, 1974
Pomeroy, village of (Meigs County)	Feb. 15, 1974
Racine, village of (Meigs County)	Mar. 22, 1974
Reading, city of (Hamilton County)	Feb. 8, 1974
Richmond Heights, city of (Cuyahoga County)	Mar 22, 1974
Richwood, village of (Union County)	May 17, 1974
Riverside, village of (Montgomery County)	Feb. 15, 1974
Rock Creek, village of (Ashtabula County)	Apr. 5, 1974
Rockford, village of (Mercer County)	Apr. 12, 1974
Rogers, village of (Columbiana County)	Mar. 22, 1974
Roseville, city of (Muskingum County)	Feb. 15, 1974
Rossford, city of (Wood County)	Mar. 1, 1974
Russells Point, village of (Logan County)	Apr. 5, 1974
Salem, city of (Columbiana County)	May 3, 1974
Seven Hills, city of (Cuyahoga County)	Mar. 22, 1974
Seven Mile, village of (Butler County)	June 14, 1974
Seville, village of (Medina County)	Mar. 15, 1974
Shawnee Hills, village of (Delaware County)	Feb. 8, 1974
Shelby, city of (Richland County)	Nov. 9, 1974
Shreve, village of (Wayne County)	Mar. 29, 1974
Smithville, village of (Wayne County)	Apr. 5, 1974
Solon, city of (Cuyahoga County)	Do.
St. Paris, village of (Champaign County)	June 7, 1974
Sugar Creek, village of (Tuscarawas County)	May 31, 1974
Syracuse, village of (Meigs County)	Apr. 5, 1974
Terrace Park, village of (Hamilton County)	Feb. 8, 1974
Toronto, city of (Jefferson County)	Jan. 16, 1974
Tuscarawas, village of (Tuscarawas County)	Apr. 5, 1974
Upper Sandusky, city of (Wyandot County)	Jan. 9, 1974
Valley View, village of (Cuyahoga County)	Jan. 23, 1974
Van Buren, village of (Hancock County)	Mar. 22, 1974
Vandalia, city of (Montgomery County)	June 7, 1974
Versailles, village of (Darke County)	Apr. 5, 1974
Wadsworth, city of (Medina County)	Mar. 1, 1974
Waite Hill, village of (Lake County)	Dec. 17, 1973
Wakeman, village of (Huron County)	Nov. 9, 1973
Warrensville Heights, city of (Cuyahoga County)	Mar. 15, 1974
Washingtonville, village of (Columbiana and Mahoning Counties)	Nov. 9, 1973
Wauseon, village of (Fulton County)	June 7, 1974
Wellington, village of (Lorain County)	Jan. 9, 1974
Wellston, city of (Jackson County)	Feb. 15, 1974
West Lake, city of (Cuyahoga County)	Apr. 12, 1974
Whitehouse, village of (Lucas County)	Mar. 29, 1974
Williamsburg, village of (Clermont County)	Do.
Windham, village of (Portage County)	Mar. 15, 1974
Wintersville, village of (Jefferson County)	May 31, 1974
Woodlawn, village of (Hamilton County)	Feb. 1, 1974
Woodsfield, village of (Monroe County)	June 7, 1974
Woodville, village of (Sandusky County)	Mar. 15, 1974
Total	202

Oklahoma

	Date of Identification
Anadarko, city of (Caddo County)	Feb. 15, 1974
Barnsdale, city of (Osage County)	Dec. 17, 1973
Binger, town of (Caddo County)	June 7, 1974
Boley, town of (Okfuskee County)	Apr. 12, 1974
Boswell, town of (Choctaw County)	Mar. 15, 1974
Carnegie, town of (Caddo County)	Dec. 7, 1973
Chelsea, city of (Rogers County)	Dec. 28, 1973
Crescent, city of (Logan County)	May 10, 1974
Dewey, city of (Washington County)	May 31, 1974
Fairfax, town of (Osage County)	Dec. 28, 1973
Fort Supply, town of (Woodward County)	May 24, 1974
Guthrie, city of (Logan County)	Dec. 28, 1973
Haskell, town of (Muskogee County)	Apr. 12, 1974
Healdton, city of (Carter County)	Dec. 28, 1973
Henryetta, city of (Okmulgee County)	Jan. 23, 1974
Hobart, city of (Kiowa County)	Dec. 7, 1973
Hominy, city of (Osage County)	Dec. 28, 1973
Hulbert, town of (Cherokee County)	Apr. 12, 1974
Idabel, city of (McCurtain County)	Jan. 23, 1974
Inola, city of (Rogers County)	May 10, 1974
Donawa, city of (Seminole County)	Apr. 5, 1974
Krebs, city of (Pittsburg County)	Dec. 28, 1973
Lone Wolf, town of (Kiowa County)	May 3, 1974
Madill, city of (Marshall County)	Nov. 23, 1973
Marlow, city of (Stephens County)	Dec. 28, 1973
Newcastle, town of (McLain County)	June 7, 1974
Pryor, city of (Mayes County)	Feb. 1, 1974
Roff, city of (Pontotoc	Mar. 22, 1974
Selling, city of (Dewey County)	May 24, 1974
Shattuck, town of (Ellis County)	Do.
Thomas, city of (Custer County)	Apr. 5, 1974
Tishomingo, city of (Johnston County)	Jan. 16, 1974
Tonkawa, city of (Kay County)	Nov. 23, 1973
Vian, town of (Sequoyah County)	May 3, 1974
Weleetka, city of (Okfuskee County)	June 14, 1974
Total	35

Oregon

	Date of Identification
Aumsville, city of (Carlon County)	May 10, 1974
Brokings, city of (Curry County)	May 31, 1974
Canby, city of (Clackamas County)	Nov. 16, 1973
Chiloquin, town of (Klamath County)	Nov. 30, 1974
Drain, city of (Douglas County)	Apr. 5, 1974
Falls City, city of (Polk County)	May 10, 1974
Huntington, city of (Baker County)	Nov. 30, 1973
Powers, city of (Coos County)	Nov. 23, 1973
Rainier, city of (Columbia County)	May 24, 1974
Riddle, city of (Douglas County)	June 7, 1974
Sisters, city of (Deschutes County)	Dec. 7, 1973
Turner, city of (Marion County)	Jan. 16, 1974
Weston, city of (Umatilla County)	May 17, 1974
Yamhill, city of (Yamhill County)	Nov. 30, 1973
Yoncalla, city of (Douglas County)	Apr. 5, 1974
Total	15

Pennsylvania

	Date of Identification
Alburtis, borough of (Lehigh County)	Jan. 16, 1974
Aleppo, township of (Allegheny County)	May 10, 1974
Auburn, borough of (Schuylkill County)	Jan. 23, 1974
Austin, borough of (Potter County)	May 17, 1974
Avalon, borough of (Allegheny County)	Feb. 1, 1974
Avonmore, borough of (Westmoreland County)	Do.
Bally, borough of (Berks County)	June 7, 1974
Beaver, borough of (Beaver County)	Mar. 15, 1974
Bell Acres, borough of (Allegheny County)	June 7, 1974
Bellevue, borough of (Allegheny County)	Dec. 28, 1973
Ben Avon, borough of (Allegheny County)	Do.
Bethel, township of (Armstrong County)	May 31, 1974

Pennsylvania—Continued

	Date of Identification
Bowmanstown, borough of (Carbon County)	Jan. 16, 1974
Boyertown, borough of (Berks County)	Dec. 28, 1973
Brecknock, township of (Lancaster County)	May 19, 1974
Burgettstown, borough of (Washington County)	Jan. 23, 1974
Central City, borough of (Somerset County)	June 7, 1974
Cheswick, borough of (Allegheny County)	Feb. 1, 1974
Clariton, city of (Allegheny County)	Jan. 16, 1974
Coalport, borough of (Clearfield County)	May 3, 1974
Dawson, borough of (Fayette County)	Dec. 28, 1973
East Pittsburgh, borough of (Allegheny County)	Mar. 29, 1974
East Rochester, borough of (Beaver County)	Feb. 1, 1974
Vandergrift, borough of (Westmoreland County)	Apr. 5, 1974
Economy, borough of (Beaver County)	Do.
Elizabeth, borough of (Allegheny County)	Jan. 9, 1974
Fairfeild, township of (Crawford County)	May 31, 1974
Fayette City, borough of (Fayette County)	Feb. 22, 1974
Garrett, borough of (Somerset County)	Apr. 12, 1974
Grampian, borough of (Clearfield County)	Do.
Houtzdale, borough of (Clearfield County)	May 17, 1974
Irvona, borough of (Clearfield County)	Apr. 12, 1974
Lansford, borough of (Carbon County)	June 7, 1974
Liberty, borough of (Allegheny County)	Dec. 28, 1973
Ligonier, borough of (Washington County)	Apr. 12, 1974
Milford, borough of (Pike County)	Apr. 5, 1974
Millerstown, borough of (Perry County)	Jan. 16, 1974
Millheim, borough of (Centre County)	May 10, 1974
Nazareth, borough of (Northampton County)	Jan. 9, 1974
New Berlin, borough of (Union County)	Feb. 22, 1974
North Buffalo, township of (Armstrong County)	Apr. 5, 1974
Oakdale, borough of (Allegheny County)	Dec. 7, 1973
Patton, borough of (Cambria County)	Feb. 1, 1974
Polk, borough of (Venango County)	Apr. 5, 1974
Rouseville, borough of (Venango County)	Jan. 23, 1974
Sandy Lake, borough of (Mercer County)	Jan. 16, 1974
Shenango, township of (Mercer County)	May 17, 1974
Shipping Port, borough of (Beaver County)	Feb. 1, 1974
Smithton, borough of (Westmoreland County)	May 31, 1974
South Coatesville, borough of (?).	Do.
South Fork, borough of (Cambria County)	Do.
Southwest Greensburg, borough of (Westmoreland County)	Feb. 1, 1974
Sprangler, borough of (Cambria County)	Do.
Spring, township of (Crawford County)	May 31, 1974
Sugar Grove, borough of (Warren County)	Do.
Sugarcreek, borough of (Venango County)	Apr. 12, 1974
Summerhill, borough of (Cambria County)	Dec. 28, 1973
Tatamy, borough of (Northampton County)	Apr. 12, 1974
Thompsontown, borough of (Juniata County)	Do.
Topton, borough of (Berks County)	May 31, 1974
Troy, borough of (Bradford County)	May 10, 1974
Turtle Creek, borough of (Allegheny County)	Feb. 1, 1974
Upper Nazareth township of (Northampton County)	Dec. 27, 1971
Venango, township of (Crawford County)	May 31, 1974
Versailles, borough of (Allegheny County)	Jan. 9, 1974
Waterford, borough of (Erie County)	May 10, 1974
Wayne, Township of (Crawford County)	May 31, 1974
Westover, borough of (Clearfield County)	Mar. 8, 1974
Womelsdorf, borough of (Berks County)	May 24, 1974
Wyalusing, borough of (Bradford County)	Feb. 1, 1974
York Haven, borough of (York County)	Jan. 23, 1974
Total	72
Rhode Island	
Hopkinton, town of (Washington County)	May 31, 1974
Richmond, town of (Washington County)	Do.
Total	2
South Carolina	
Abbeville, city of (Abbeville County)	May 31, 1974
Andrews, town of (Georgetown County)	May 24, 1974
Belton, town of (Anderson County)	Do.
Blackville, town of (Barnwell County)	June 7, 1974
Bluffton, town of (Beaufort County)	May 17, 1974
Bowman, town of (Orangeburg County)	May 31, 1974
Branchville, town of (Orangeburg County)	June 7, 1974
Clover, town of (York County)	May 24, 1974
Dillon, town of (Dillon County)	May 17, 1974
Eastover, town of (Richland County)	May 31, 1974
Edgefield, town of (Edgefield County)	May 24, 1974
Fairfax, town of (Allendale County)	May 31, 1974
Harleyville, town of (Dorchester County)	May 24, 1974
Hemingway, town of (Williamsburg County)	June 7, 1974
Holly Hill, town of (Orangeburg County)	Do.
Irmo, town of (Lexington County)	May 17, 1974
Iva, town of (Anderson County)	May 31, 1974
Jackson, town of (Aiken County)	May 17, 1974
Lake View, town of Dillon County)	May 24, 1974
Lane, town of (Williamsburg County)	May 17, 1974
McCormick, city of (McCormick County)	June 7, 1974
Moncks Corner, town of (Berkeley County)	May 24, 1974
Olanta, town of (Florence County)	May 24, 1974
Pamplico, town of (Florence County)	May 10, 1974
Ridgeville, town of (Dorchester County)	May 31, 1974
Scranton, town of (Florence County)	May 24, 1974
Sellers, town of (Marion County)	June 7, 1974
Seneca, town of (Oconee County)	June 14, 1974
South Congaree, town of (Lexington County)	May 17, 1974
Timmonsville, town of (Florence County)	May 24, 1974
Warrenville, town of (Aiken County)	June 14, 1974
Williamston, town of (Anderson County)	May 31, 1974
Total	32
South Dakota	
Colome, city of (Tripp County)	May 10, 1974
Plankinton, city of (Aurora County)	June 7, 1974
Total	2
Tennessee	
Bell Buckle, town of (Bedford County)	June 14, 1974
Bristol, city of (Sullivan County)	Mar. 8, 1974
Calhoun, city of (McMinn County)	Do.
Chapel Hill, town of (Marshall County)	June 14, 1974
Charleston, city of (Bradley County)	Feb. 1, 1974
Dayton, city of (Rhea County)	Mar. 1, 1974
Dunlap, city of (Sequatchie County)	May 24, 1974
Dyer, town of (Gibson County)	May 31, 1974
Englewood, city of (McMinn County)	May 17, 1974
Estill Springs, city of (Franklin County)	Feb. 1, 1974
Graysville, city of (Rhea County)	Mar. 8, 1974
Iron City, city of (Lawrence County)	June 14, 1974
Kimball, town of (Marion County)	Do.
Kingston, city of (Roane County)	Mar. 8, 1974
Lewisburg, city of (Marshall County)	Mar. 1, 1974
Lynnville, city of (Giles County)	June 14, 1974
Milan, town of (Gibson County)	May 24, 1974
Richard City, city of (Marion County)	Feb. 1, 1974
Ridgetop, city of (Robertson County)	June 7, 1974
Rogersville, city of (Hawkins County)	Feb. 15, 1974
Rutherford, town of Gibson County)	June 7, 1974
Saltillo, town of (Hardin County)	June 14, 1974
Sneedville, city of (Hancock County)	Feb. 1, 1974

Tennessee—Continued

	Identification Date of
Somerville, town of (Fayette County)	May 17, 1974
Spring Hill, city of (Maury County)	Do.
Surgoinsville, city of (Hawkins County)	Do.
Tellico Plains, city of (Monroe County)	Mar. 8, 1974
Tracy City, city of (Grundy County)	May 10, 1974
Trenton, town of (Gibson County)	May 3, 1974
Wartrace, town of (Bedford County)	June 14, 1974
Whitwell, city of (Marion County)	Feb. 15, 1974
Total	31

Texas

	Identification Date of
Alamo, city of (Hidalgo County)	Jan. 23, 1974
Albany, city of (Shackelford County)	May 3, 1974
Anton, city of (Hockley County)	Mar. 29, 1974
Balch Springs, city of (Dallas County)	Mar. 8, 1974
Bandera, city of (Bandera County)	Apr. 12, 1974
Blanco, city of (Blanco County)	May 3, 1974
Blue Mound, city of (Tarrant County)	Dec. 17, 1973
Booker, city of (Ochiltree and Lipscomb Counties)	May 24, 1974
Bowie, city of (Montague County)	May 3, 1974
Boyd, city of (Wise County)	Dec. 28, 1973
Briar Oaks, city of (Johnson County)	Mar. 29, 1974
Bronte, town of (Coke County)	Do.
Cactus, city of (Moore County)	June 14, 1974
Canton, city of (Van Zandt County)	May 10, 1974
Canutillo, city of (El Paso County)	Jan. 9, 1974
Carrizo Springs, city of (Dimmit County)	May 3, 1974
Center, City of (Shelby County)	Mar. 1, 1974
Cisco, city of (Eastland County)	May 3, 1974
Clarksville, city of (Red River County)	Feb. 15, 1974
Cockrell Hill, city of (Dallas County)	Dec. 7, 1973
Combes, town of (Cameron County)	May 10, 1974
Cooper, city of (Delta County)	Jan. 9, 1974
Copperas Cove, city of (Coryell County)	Apr. 5, 1974
Corrigan, city of (Polk County)	May 24, 1974
Cotulla, city of (LaSalle County)	Dec. 17, 1973
Crandall, city of (Kaufman County)	Mar. 8, 1974
De Leon, city of (Comanche County)	Apr. 5, 1974
De Kalb, town of (Bowie County)	May 24, 1974
Dimmit, city of (Castro County)	May 10, 1974
Donna, city of (Hidalgo County)	Feb. 1, 1974
Eagle Lake, city of (Colorado County)	May 10, 1974
Early, city of (Brown County)	May 17, 1974
Edcouch, city of (Hidalgo County)	May 10, 1974
Edgewood, city of (Van Zandt County)	June 14, 1974
El Campo, city of (Wharton County)	June 7, 1974
Everman, city of (Tarrant County)	Dec. 17, 1973
Floydada, city of (Floyd County)	May 31, 1974
Friona, city of (Parmer County)	April 12, 1974
Gonzales, city of (Gonzales County)	May 24, 1974
Grand Saline, city of (Van Zandt County)	May 10, 1974
Hale Center, city of (Hale County)	Do.
Haskell, city of (Haskell County)	May 17, 1974
Hewitt, city of (McLennan County)	Jan. 23, 1974
Iowa Park, city of (Wichita County)	Apr. 5, 1974
Jasper, city of (Jasper County)	Mar. 29, 1974
Kennedale, city of (Tarrant County)	Feb. 1, 1974
Kermit, city of (Winkler County)	May 24, 1974
Kilgore, city of (Gregg and Rusk Counties)	Do.
Kingsville, city of (Kleberg County)	Feb. 26, 1971
Kleberg County, Unincorporated Area	Aug. 17, 1971
La Grange, city of (Fayette County)	Mar. 22, 1974
La Joya, city of (Hidalgo County)	Jan. 23, 1974
La Villa, city of (Hidalgo County)	Do.
Lacoste, city of (Medina County)	Jan. 9, 1974
Lefors, city of (Gray County)	May 10, 1974
Lindale, city of (Smith County)	Mar. 22, 1974
Llano, city of (Llano County)	Dec. 28, 1973
Lorenzo, city of (Crosby County)	April 12, 1974
Lyford, city of (Willacy County)	May 17, 1974
Madisonville, city of (Madison County)	Do.
Marion, city of (Guadalupe County)	Jan. 9, 1974
Mason, city of (Mason County)	May 10, 1974
McLean, city of Gray County)	May 17, 1974
Mexia, city of (Limestone County)	Mar. 15, 1974
Miami, city of (Roberts County)	May 24, 1974
Mineola, city of (Wood County)	May 3, 1974
Moulton, town of (Lavaca County)	Apr. 5, 1974
Mount Pleasant, city of (Titus County)	Feb. 1, 1974
Munday, city of (Knox County)	May 17, 1974
Murphy, city of (Collin County)	Dec. 7, 1973
Newton, city of (Newton County)	June 7, 1974
Nocona, city of (Montague County)	May 10, 1974
Nolanville, city of (Bell County)	May 24, 1974
Oakwood Grove, city of (Leon County)	Do.
Orange Grove, city of (Jim Wells County)	May 3, 1974
Ozona, city of (Rockett County)	Dec. 7, 1974
Palestine, city of (Anderson County)	May 31, 1974
Pampa, city of (Gray County)	May 10, 1974
Petersburg, city of (Hale County)	April 12, 1974
Pinehurst, city of (Orange County)	July 2, 1974
Pittsburg, city of (Camp County)	Jan. 23, 1974
Post, city of (Garza County)	April 12, 1974
Poteet, city of (Atascosa County)	Jan. 23, 1974
Poth, city of (Wilson County)	May 24, 1974
Quinlan, city of (Hunt County)	April 12, 1974
Ranger, city of (Eastland County)	May 17, 1974
Rankin, city of (Upton County)	May 10, 1974
Roby, city of (Fisher County)	May 17, 1974
Rotan, city of (Fisher County)	April 12, 1974
Toxton, city of (Lamar County)	May 3, 1974
Sachse, city of (Dallas County)	Feb. 22, 1974
Saginaw, city of (Tarrant County)	Mar. 8, 1974
San Juan, city of (Hidalgo County)	Mar. 22, 1974
Santa Rosa, city of (Cameron County)	May 17, 1974
Seagoville, city of (Dallas County)	Feb. 1, 1974
Sealy, city of (Austin County)	Dec. 17, 1973
Seminole, city of (Gaines County)	May 24, 1974
Slaton, city of (Lubbock County)	Mar. 22, 1974
Somerville, city of (Burleson County)	May 3, 1974
Spearman, city of (Hansford County)	May 17, 1974
Stanton, city of (Martin County)	Jan. 16, 1974
Sterling Cit, town of (Sterling County)	May 24, 1974
Stinnett, city of (Hutchinson County)	May 31, 1974
Stockdale, city of (Wilson County)	Do.
Sundown, city of (Hockley County)	April 12, 1974
Tahoka, city of (Lynn County)	May 10, 1974
Troup, city of (Smith County)	April 12, 1974
Valley Mills, city of (Bosque County)	May 3, 1974
Van Horn, town of (Culberson County)	May 10, 1974
Vernon, city of (Wilbarger County)	May 17, 1974
Wallis, city of (Austin County)	May 24, 1974
Wheeler, city of (Wheeler County)	Mar. 29, 1974
Whitehouse, city of (Smith County)	May 17, 1974
Wills Point, city of (Van Zandt County)	Do.
Winters, city of (Runnels County)	Dec. 17, 1973
Yoakum, city of (Lavaca County)	May 10, 1974
Total	116

Utah

	Identification Date of
Beaver, city of (Beaver County)	June 11, 1974
Eureka, city of (Juab County)	June 7, 1974
Grantsville, city of (Tooele County)	May 31, 1974

	Date of Identification
Utah—Continued	
Huntington, city of (Emery County)	May 24, 1974
Orangeville, city of (Emery County)	June 7, 1974
West Bountiful, city of (Davis County)	Dec. 28, 1973
Willard, city of (Box Elder County)	June 7, 1974
Total	7
Vermont	
Berkshire, town of (Franklin County)	May 31, 1974
Berlin, town of (Washington County)	Feb. 15, 1974
Canaan, town of (Lamoille County)	May 31, 1974
Clarendon, town of (Ruthland County)	Do.
Enosburg Falls, village of (Franklin County)	Apr. 5, 1974
Fairfax, town of (Franklin County)	May 17, 1974
Highgate, town of (Franklin County)	May 31, 1974
Jericho, town of (Chittenden County)	June 14, 1974
Milton, village of (Chittenden County)	May 3, 1974
Moretown, town of (Washington County)	May 31, 1974
Northfield, town of (Washington County)	Do.
Readsboro, town of (Bennington County)	Do.
Sheldon, town of (Franklin County)	Apr. 12, 1974
Sunderland, town of (Bennington County)	Feb. 1, 1974
Swanton, village of (Franklin County)	Mar. 22, 1974
Turnbridge, town of (Orange County)	May 31, 1974
Williston, town of (Chittenden County)	Mar. 15, 1974
Total	17
Virginia	
Duffield, town of (Scott County)	Mar. 8, 1974
Dungannon, town of (Scott County)	Mar. 22, 1974
Jonesville, town of (Lee County)	June 14, 1974
Mount Jackson, town of (Shenandoah County)	May 31, 1974
Roykins, town of (Southhampton County)	Do.
St. Charles, town of (Lee County)	May 17, 1974
Total	6
Washington	
Benton City, town of (Benton County)	Jan. 9, 1974
Bingen, town of (Klickitat County)	June 7, 1974
Carnation, town of (King County)	May 31, 1974
Colville, city of (Stevens County)	Dec. 28, 1973
Deer Park, city of (Spokane County)	Apr. 5, 1974
Elma, town of (Grays Harbor County)	June 7, 1974
Ephrata, city of (Grant County)	May 31, 1974
Medical Lake, town of (Spokane County)	June 7, 1974
Palouse, city of (Whitman County)	May 24, 1974
Port Angeles, city of (Clallam County)	May 31, 1974
Prosser, town of (Benton County)	Jan. 23, 1974
Washington—Continued	
Republic, town of (Ferry County)	June 7, 1974
Rosalia, town of (Whitman County)	May 24, 1974
Shelton, city of (Mason County)	June 14, 1974
St. John, town of (Whitman County)	May 24, 1974
Total	15
West Virginia	
Anawalt, town of (McDowell County)	May 31, 1974
Beckley, city of (Raleigh County)	June 7, 1974
Belle, town of (Kanawha County)	Mar. 1, 1974
Bethany, town of (Brooke County)	Feb. 8, 1974
Buffalo, town of (Putnam County)	Feb. 1, 1974
Cedar Grove, town of (Kanawha County)	Mar. 8, 1974
Franklin, town of (Pendleton County)	May 31, 1974
Hambleton, town of (Tucker County)	Feb. 1, 1974
Hurricane, village of (Putnam County)	Apr. 5, 1975
Montgomery, city of (Fayette and Kanawha Counties)	May 24, 1974
Pine Grove, town of (Wetzel County)	Do.
Tridelphia, town of (Ohio County)	Feb. 8, 1974
Valley Grove, town of (Ohio County)	Feb. 1, 1974
War, town of (McDowell County)	May 31, 1974
West Hamlin, town of (Lincoln County)	Do.
Total	15
Wisconsin	
Arcadia, city of (Trempealeau County)	Nov. 30, 1973
Athens, village of (Marathon County)	May 31, 1974
Augusta, village of (Eau Claire County)	May 10, 1974
Baldwin, village of (St. Croix County)	Do.
Barneveld, village of (Iowa County)	May 17, 1974
Barron, city of (Barron County)	Dec. 17, 1973
Belgium, village of (Ozaukee County)	June 7, 1974
Bell Center, village of (Crawford County)	Jan. 9, 1974
Belleville, village of (Dane and Green Counties)	Do.
Belmont, village of (Lafayette County)	May 17, 1974
Black Earth, village of (Dane County)	Dec. 17, 1973
Boscobel, city of (Grant County)	Do.
Bowler, village of (Shawano County)	Nov. 30, 1973
Browntown, village of (Green County)	Jan. 9, 1974
Cambridge, village of (Dane County)	Dec. 17, 1973
Cameron, village of (Barron County)	Dec. 28, 1973
Cascade, village of (Sheboygan County)	May 3, 1974
Chaseburg, village of (Vernon County)	Dec. 28, 1973
Cumberland, city of (Barron County)	May 31, 1974
Delafield, city of (Waukesha County)	June 7, 1974
Wisconsin—Continued	
Doylestown, village of (Columbia County)	May 17, 1974
Eagle River, city of (Vilas County)	Dec. 28, 1973
East Troy, village of (Walworth County)	May 24, 1974
Edgerton, city of (Rock County)	Dec. 17, 1973
Elroy, city of (Juneau County)	June 7, 1974
Endeavor, village of (Marquette County)	Dec. 17, 1973
Ettrick, village of (Trempealeau County)	Nov. 30, 1973
Fairchild, village of (Eau Claire County)	May 31, 1974
Fall Creek, village of (Eau Claire County)	May 24, 1974
Forestville, village of (Door County)	Nov. 30, 1973
Fortville, village of (Rock County)	May 31, 1974
Fox Lake, city of (Dodge County)	May 24, 1974
Francis Creek, village of (Manitowoc County)	May 17, 1974
Galesville, city of (Trempealeau County)	Nov. 30, 1973
Gillett, city of (Oconto County)	April 12, 1974
Gratiot, village of (Lafayette County)	Jan. 16, 1974
Hammond, village of (St. Croix County)	May 10, 1974
Hartland, village of (Waukesha County)	Nov. 30, 1973
Holeman, village of (La Crosse County)	May 17, 1974
Horicon, city of (Dodge County)	Nov. 30, 1973
Howard, village of (Brown County)	Dec. 28, 1973
Hustisford, village of (Dodge County)	Nov. 30, 1973
Iola, village of (Waupaca County)	June 7, 1974
Johnson Creek, village of (Jefferson County)	Jan. 9, 1974
Kekoskee, village of (Dodge County)	Jan. 23, 1974
Kewaskum, village of (Washington County)	Dec. 28, 1973
Kiel, city of (Manitowoc County)	Feb. 8, 1974
Lake Hills, city of (Jefferson County)	May 17, 1974
Lannon, village of (Waukesha County)	Dec. 28, 1973
Lena, village of (Oconto County)	May 24, 1974
Livingston, village of (Grant County)	May 17, 1974
Lone Rock, village of (Richland County)	Do.
Lowell, village of (Dodge County)	Do.
Luxemburg, village of (Kewaunee County)	May 10, 1974
Madison, city of (Dane County)	Mar. 8, 1974
Marquette, village of (Green Lake County)	Dec. 28, 1973
Marshall, village of (Dane County)	Dec. 17, 1973
Mauston, city of (Juneau County)	Do.
Mayville, city of (Dodge County)	Nov. 30, 1973
Mazomaine, village of (Dane County)	Dec. 28, 1973
Melrose, village of (Jackson County)	Dec. 17, 1973
Merrillan, village of (Jackson County)	May 31, 1974

Wisconsin—Continued

	Date of Identification
Merton, village of (Waukesha County)	Dec. 28, 1973
Mineral Point, city of (Iowa County)	May 31, 1974
Mt. Calvary, village of (Fond Du Lac County)	June 7, 1974
Necedah, village of (Juneau County)	Jan. 9, 1974
Nelsonville, village of (Portage County)	Jan. 23, 1974
New Lisbon, city of (Juneau County)	Dec. 17, 1973
Onalaska, city of (La Crosse County)	Dec. 28, 1973
Ontario, village of (Vernon County)	Jan. 9, 1974
Orfordville, village of (Rock County)	May 24, 1974
Osseso, village of (Trempealeau County)	May 3, 1974
Parkeeville, village of (Columbia County)	Dec. 28, 1973
Park Ridge, village of (Portage County)	Do.
Poplar, village of (Douglas County)	Do.
Port Washington, town of (Ozaukee County)	May 31, 1974
Potosi, village of (Grant County)	Dec. 28, 1973
Poynette, village of (Columbia County)	May 3, 1974
Prairie Du Sac, village of (Sauk County)	Dec. 7, 1973
Prairie Farm, village of (Barron County)	Do.
Prentice, village of (Price County)	Dec. 28, 1973
Princeton, city of (Green Lake County)	Do.
Pulaski, village of (Brown County)	May 24, 1974
Redgranite, village of (Waushara County)	May 17, 1974
Rib Lake, village of (Taylor County)	May 24, 1974
Rice Lake, city of (Barron County)	Dec. 7, 1973
Rockdale, village of (Dane County)	Do.
Shullsburg, city of (Lafayette County)	May 17, 1974
Solon Springs, village of (Douglas County)	June 7, 1974
South Wayne, village of (Lafayette County)	Dec. 7, 1973
Spring Green, village of (Sauk County)	Do.
Spring Valley, village of (Pierce County)	June 14, 1974
Star Prairie, village of (St. Croix County)	Dec. 28, 1973
Sturtevent, village of (Racine County)	May 24, 1974
St. Croix Falls, city of (Polk County)	Do.
St. Francis, city of (Milwaukee County)	June 7, 1974
Sullivan, village of (Jefferson County)	Apr. 12, 1974
Taylor, village of (Jackson County)	Dec. 7, 1973
Theresa, village of (Dodge County)	Do.
Waterloo, city of (Jefferson County)	Dec. 28, 1973
Wausaukee, village of (Marinette County)	May 24, 1974
Wautoma, city of (Waushara County)	May 17, 1974
West Baraboo, village of (Sauk County)	Jan. 16, 1974
West Bend, city of (Washington County)	Dec. 28, 1973
Westfield, village of (Marquette County)	May 24, 1974
Wild Rose, village of (Waushara County)	May 31, 1974
Wilton, village of (Monroe County)	May 17, 1974
Winnesconne, village of (Winnebago County)	Jan. 16, 1974
Wisconsin Dells, city of (Columbia County)	Dec. 17, 1973
Wonewoc, village of (Juneau County)	Dec. 7, 1973
Woodman, village of (Grant County)	Jan. 16, 1974
Woodville, village of (St. Croix County)	May 24, 1974
Total	113

Wyoming

Dubois, town of (Fremont County)	Jan. 23, 1974
Jackson, town of (Teton County)	May 10, 1974
Kemmerer, town of (Lincoln County)	Mar. 29, 1974
Laramie, city of (Albany County)	Apr. 5, 1974
Riverton, city of (Fremont County)	Mar. 29, 1974
Saratoga, town of (Carron County)	June 14, 1974
Torrington, town of (Goshen County)	Mar. 15, 1974
Wheatland, town of (Platte County)	Apr. 12, 1974
Total	8
National total	1,979

(National Flood Insurance Act of 1968 (title XIII of the Housing and Urban Development Act of 1968); effective Jan. 28, 1969 (33 FR 17804, Nov. 28, 1968), as amended, 42 U.S.C. 4001–4128; and Secretary's delegation of authority to Federal Insurance Administrator, 34 FR 2680, Feb. 27, 1969) as amended 39 FR 2787, Jan. 24, 1974.

Dated: June 17, 1975.

J. ROBERT HUNTER,
Acting Federal Insurance Administrator.

[FR Doc.75-16504 Filed 6-24-75;8:45 am]

Office of Interstate Land Sales Registration

[Docket No. N-75-380]

EDELWEISS MOUNTAIN DEVELOPER

Hearing

In the matter of Edelweiss Mountain Developer, Black Forest Development, Inc., OILSR No. 0-3200-47-2, Docket No. ED-75-8.

Pursuant to 15 U.S.C. 1706(b) and 24 CFR 1720.155(b) notice is hereby given that:

1. Black Forest Development, Inc., Developer of Edelweiss Mountain Subdivision, its officers and agents, hereinafter referred to as "Respondent," being subject to the provisions of the Interstate Land Sales Full Disclosure Act (Pub. L. 90-448) (15 U.S.C. 1701 et seq.), received a Notice of Suspension dated May 19, 1975, which was sent to the developer pursuant to 15 U.S.C. 1706(b) and 24 CFR 1720.45(a) informing the developer that its amended Statement of Record submitted April 28, 1975, for Black Forest Development, Inc., Edelweiss Mountain Subdivision, located in Pennington County, South Dakota, was not effective pursuant to the Act, and the regulations contained in 24 CFR Part 1710.

2. The Respondent filed an answer dated June 10, 1975, in answer to the allegations of the notice of suspension dated May 19, 1975.

3. In said Answer the Respondent requested a hearing on the allegations contained in the notice of suspension.

4. Therefore, pursuant to the provisions of 15 U.S.C. 1706(b) and 24 CFR 1720.155(b), *it is hereby ordered*, That a public hearing for the purpose of taking evidence on the questions set forth in the Notice of Suspension will be held before James W. Mast, Administrative Law Judge, in Room 7146, Department of HUD Building, 451 7th Street, SW., Washington, D.C. on June 25, 1975, at 1 p.m.

The following time and procedure is applicable to such hearing:

All affidavits and a list of all witnesses are requested to be filed with the Hearing Clerk, HUD Building, Room 10150, Washington, D.C. 20410 on or before June 23, 1975.

5. The Respondent is hereby notified that failure to appear at the above scheduled hearing shall be deemed a default and the suspension of the Statement of Record, herein identified, shall continue until vacated by order of the Secretary, pursuant to 24 CFR 1720.155.

This notice shall be served upon the Respondent forthwith pursuant to 24 CFR 1720.440.

By the Secretary.

JAMES W. MAST,
Administrative Law Judge.

[FR Doc.75-16507 Filed 6-24-75;8:45 am]

[Docket No. N-75-379]

KULA KAI VIEW ESTATES

Hearing

In the matter of Kula Kai View Estates, OILSR No. 0-1147-14-18 Docket No. Y-183-IS.

Pursuant to 15 U.S.C. 1706(d) and 24 CFR 1720.160(d) notice is hereby given that:

1. Hawaii Kona Kai, Inc., Joni Johnston, President, its officers and agents, hereinafter referred to as "Respondent," being subject to the provisions of the Interstate Land Sales Full Disclosure Act (Pub. L. 90-448) (15 U.S.C. 1701 et seq.), received a Notice of Proceedings and Opportunity for Hearing issued May 15, 1975, which was sent to the developer pursuant to 15 U.S.C. 1706(d), 24 CFR 1710.45(b)(1) and 1720.125 informing the developer of information obtained by the Office of Interstate Land Sales Registration alleging that the Statement of Record and Property Report for Kula Kai View Estates, located in Hawaii County, Hawaii, contain untrue statement of material fact or omit to state material facts required to be stated therein as necessary to make the statements therein not misleading.

2. The Respondent filed an answer received June 6, 1975, in response to the

Notice of Proceedings and Opportunity for Hearing.

3. In said answer the Respondent requested a hearing on the allegations contained in the Notice of Proceedings and Opportunity for Hearing.

4. Therefore, pursuant to the provisions of 15 U.S.C. 1706(d) and 24 CFR 1720.160(d), *it is hereby ordered*, That a public hearing for the purpose of taking evidence on the questions set forth in the Notice of Proceedings and Opportunity for Hearing will be held before Judge James W. Mast, in Room 7146, Department of HUD, 451 7th Street, SW., Washington, D.C., on July 24, 1975, at 10 a.m.

The following time and procedure is applicable to such hearing: All affidavits and a list of all witnesses are requested to be filed with the Hearing Clerk, HUD Building, Room 10150, Washington, D.C., 20410 on or before July 17, 1975.

5. The Respondent is hereby notified that failure to appear at the above scheduled hearing shall be deemed a default and the proceedings shall be determined against Respondent, the allegations of which shall be deemed to be true, and an order Suspending the Statement of Record, herein identified, shall be issued pursuant to 24 CFR 1710.45(b)(1).

This notice shall be served upon the Respondent forthwith pursuant to 24 CFR 1720.440.

Dated: June 18, 1975.

By the Secretary.

JAMES W. MAST,
Administrative Law Judge.

[FR Doc.75-16506 Filed 6-24-75;8:45 am]

INTERSTATE COMMERCE COMMISSION

[Notice 796]

ASSIGNMENT OF HEARINGS

JUNE 20, 1975.

Cases assigned for hearing, postponement, cancellation or oral argument appear below and will be published only once. This list contains prospective assignments only and does not include cases previously assigned hearing dates. The hearings will be on the issues as presently reflected in the Official Docket of the Commission. Are attempt will be made to publish notices of cancellation of hearings as promptly as possible, but interested parties should take appropriate steps to insure that they are notified of cancellation or postponements of hearings in which they are interested.

MC 114569 Sub 113, Shaffer Trucking, Inc., now assigned September 10, 1975, at Chicago, Ill., is canceled, and transferred to Modified Procedure.

MC 115841 Sub 496, Colonial Refrigerated Transportation, Inc. application dismissed.

MC 14060, Spinelli Bros. Trucking Inc., now assigned July 7, 1975, at Philadelphia, Pa., is canceled and application dismissed.

MC-F-12456, Skyline Transport, Inc.—Leaxe (Portion)—O'Boyle Tank Lines, Incorporated, now being assigned September 9, 1975, at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 13250 Sub 128, J. H. Rose Truck Line, Inc.; MC 29886 Sub 321, Dallas & Mavis Forwarding Co., Inc.; MC 73165 Sub 359, Eagle Motor Lines, Inc.; MC 83539 Sub 403, C. & H. Transportation Co., Inc.; MC 106644 Sub 200, Superior Trucking Company, Inc.; MC 111320 Sub 63, Keen Transports, Inc.; MC 111545 Sub 209, Home Transportation Company, Inc.; MC 113459 Sub 95, H. J. Jefferies Truck Line, Inc.; MC 113495 Sub 68, Gregory Heavy Haulers, Inc.; MC 113855 Sub 306, International Transport, Inc. and MC 124947 Sub 35, Machinery Transports, Inc., now being assigned September 22, 1975 at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 2900 Sub 267, Ryder Truck Lines, Inc., and MC 115841 Sub 495, Colonial Refrigerated Transportation, Inc., now being assigned September 11, 1975, at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 51146 Sub 402, Schneider Transport, Inc., now being assigned September 25, 1975, at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 134783 Sub 27, Direct Service, Inc., now being assigned September 25, 1975, at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 127616 Savage Trucking Company, Inc., now being assigned September 25, 1975, at the Offices of the Interstate Commerce Commission, Washington, D.C.

MC 128981 Sub 9, Land-Air Delivery, Inc., now being assigned October 1, 1975, at the Office of the Interstate Commerce Commission, Washington, D.C.

MC 111956 Sub 32, Suwak Trucking Company, now assigned July 14, 1975, at Pittsburgh, Pennsylvania is canceled and transferred to Modified Procedure.

MC 95876 Sub 159, Anderson Trucking Service, Inc., now assigned July 21, 1975, at Chicago, Illinois, is canceled and the application is dismissed.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16572 Filed 6-24-75;8:45 am]

FOURTH SECTION APPLICATIONS FOR RELIEF

JUNE 20, 1975.

An application, as summarized below, has been filed requesting relief from the requirements of section 4 of the Interstate Commerce Act to permit common carriers named or described in the application to maintain higher rates and charges at intermediate points than those sought to be established at more distant points.

Protests to the granting of an application must be prepared in accordance with Rule 40 of the general rules of practice (49 CFR 1100.40) and filed on or before July 10, 1975.

FSA No. 43007 —*Barley, Corn, Grain Sorghums, Etc., from Points in Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska and Oklahoma.* Filed by South western Freight Bureau, Agent, (No. B-505), for interested rail carriers. Rates on barley, corn (not pop corn), grain sorghums, etc., in carloads, as described in the application, from points in Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska and Oklahoma, to points in Arkansas, Louisiana, Oklahoma and Texas; also Natchez, Mississippi.

Grounds for relief—Rate relationship and truck competition.

Tariffs—Supplement 161 to Southwestern Freight Bureau, Agent, tariff 180-L, I.C.C. No. 4901, and 4 other schedules named in the application. Rates are published to become effective on July 27, 1975.

FSA No. 43008—*Joint Water-Rail Container Rates—Mitsui O. S. K. Lines, Ltd.* Filed by Mitsui O. S. K. Lines, Ltd., (No. 101), for itself and interested rail carriers. Rates on general commodities, between ports in Hong Kong, Japan, Korea, and Taiwan, and rail stations on the U.S. Atlantic and Gulf Seaboard. Grounds for relief—Water competition.

By the Commission.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16571 Filed 6-24-75;8:45 am]

IRREGULAR-ROUTE MOTOR COMMON CARRIERS OF PROPERTY

Elimination of Gateway Applications

JUNE 20, 1975.

The following applications to eliminate gateways for the purpose of reducing highway congestion, alleviating air and noise pollution, minimizing safety hazards, and conserving fuel have been filed with the Interstate Commerce Commission under the Commission's Gateway Elimination Rules (49 CFR 1065(d)(2)), and notice thereof to all interested persons is hereby given as provided in such rules.

Carriers having a genuine interest in an application may file an original and three copies of *verified statements* in opposition with the Interstate Commerce Commission on or before July 25, 1975. (This procedure is outlined in the Commission's report and order in *Gateway Elimination,* 119 M.C.C. 530.) A copy of the verified statement in opposition must also be served upon applicant or its named representative. The verified statement should contain all the evidence upon which protestant relies in the application proceeding including a detailed statement of protestant's interest in the proposal. No rebuttal statements will be accepted.

No. MC 13250 (Sub-No. 130G), filed April 28, 1975. Applicant: J. H. ROSE TRUCK LINE, INC., P.O. Box 16190, Houston, Tex. 77022. Applicant's representative: James M. Doherty, 500 West Sixteenth Street, Austin, Tex. 78701. Authority sought to operate as a *common carrier,* by motor vehicle, over irregular routes, transporting: I. (A) *Commodities* (except boats and classes A and B explosives), which because of their size or weight require the use of special equipment, and related machinery parts and related contractors' materials and supplies when their transportation is incidental to the transportation of commodities which by reason of size or weight require special equipment and (B) *self-propelled articles* (except boats), each weighing 15,000 pounds or more, and related machinery, tools, parts and supplies moving in connection therewith, restricted in (B) to commodities which are transported on trailers, (1) between points in Alabama, on the one hand, and, on the other, points in Arizona, Colorado, Idaho, Nevada, New Mexico, and Utah. The purpose of this filing is to eliminate the gateways of points in Texas, Utah, and Arizona. (2) between points in Arizona, on the one hand, and, on the other, points in Florida, Georgia, Mississippi, North Carolina, and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas.

(3) Between points in Colorado, on the one hand, and, on the other, points in Georgia, Florida, Mississippi, North Carolina, and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas. (4) Between points in Florida, on the one hand, and, on the other, points in Idaho, Kansas, Nevada, New Mexico, Oklahoma and Utah. The purpose of this filing is to eliminate the gateways of points in Texas, Utah, and Arizona. (5) Between points in Georgia, on the one hand, and, on the other, points in Idaho, Nevada, New Mexico, and Utah. The purpose of this filing is to eliminate the gateways of points in Texas, Utah, and Arizona. (6) Between points in Idaho, on the one hand, and, on the other, points in Mississippi, North Carolina, and South Carolina. The purpose of this filing is to eliminate the gateways of points in Texas and Utah. (7) Between points in Mississippi, on the one hand, and, on the other, points in Nevada, New Mexico and Utah. The purpose of this filing is to eliminate the gateways of points in Texas, Arizona, and Utah. (8) Between points in Nevada, on the one hand, and, on the other, points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateways of points in Arizona, Texas and Utah. (9) Between points in New Mexico, on the hand, and, on the other, points in North Carolina and South Caro-

lina. The purpose of this filing is to eliminate the gateway of points in Texas. (10) Between points in North Carolina, on the one hand, and, on the other, points in Utah. The purpose of this filing is to eliminate the gateway of points in Texas. (11) Between points in South Carolina, on the one hand, and, on the other, points in Utah. The purpose of this filing is to eliminate the gateway of points in Texas.

II. (A) *Commodities* (except boats and classes A and B explosives), which because of their size or weight require the use of special equipment, and related machinery parts and related contractors' materials and supplies when their transportation is incidental to the transportation of commodities which by reason of size or weight require special equipment and (B) *self-propelled articles* (except boats), each weighing 15,000 pounds or more, and related machinery, tools, parts and supplies moving in connection therewith, restricted in (B) to commodities which are transported on trailers, (1) between points in Alabama, on the one hand, and, on the other, points in Arkansas, Kansas, Louisiana, Missouri and Oklahoma. The purpose of this filing is to eliminate the gateway of points in Texas. (2) between points in Arkansas, on the one hand, and, on the other, points in Florida, Georgia, Mississippi, North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas. (3) between points in Florida, and on the one hand, and, on the other, points in Louisiana and Missouri. The purpose of this filing is to eliminate the gateway of points in Texas. (4) between points in Georgia, on the one hand, and, on the other, points in Kansas, Louisiana, Missouri, and Oklahoma. The purpose of this filing is to eliminate the gateway of points in Texas. (5) between points in Kansas, on the one hand, and, on the other, points in Mississippi, North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas. (6) between points in Louisiana, on the one hand, and, on the other, points in Mississippi, North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas.

(7) Between points in Mississippi, on the one hand, and, on the other, points in Missouri and Oklahoma. The purpose of this filing is to eliminate the gateway of points in Texas. (8) between points in Missouri, on the one hand, and, on the other, points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas. (9) between points in North Carolina, on the one hand, and, on the other, points in Oklahoma. The purpose of this filing, is to eliminate the gateway of points in Texas. (10) between points in Oklahoma, on the one hand, and, on the other, points in South Carolina. The purpose of this filing is to eliminate the gateway of points in Texas.

No. MC 111401 (Sub-No. 422G), filed June 4, 1974. Applicant: GROENDYKE TRANSPORT, INC., 2510 Rock Island Boulevard, P.O. Box 632, Enid, Okla. 73701. Applicant's representative: Alvin J. Meiklejohn, Jr., Suite 1600, Lincoln Center, 1660 Lincoln Street, Denver, Colo. 80203. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Liquefied petroleum gas*, in bulk, from points in Kansas, Oklahoma and that part of Texas on and north of U.S. Highway 66 from the Texas-New Mexico State line to junction U.S. Highway 83, and on and east of U.S. Highway 83 from its junction with U.S. Highway 66 to the boundary line between Texas and Mexico, to points in Arizona, Arkansas, California, Louisiana, Michigan, Missouri, New Jersey, New Mexico, North Carolina, Ohio, Tennessee, West Virginia, and Wisconsin. The purpose of this filing is to eliminate the gateways of Tulsa, Sunray, and Ardmore, Okla., Ulysses and Wichita, Kans., and Chaison, Longview, and Texas City, Tex.

No. MC 111401 (Sub-No. 425G), filed June 4, 1974. Applicant: GROENDYKE TRANSPORT, INC., 2510 Rock Island Boulevard, P.O. Box 632, Enid, Okla. 73701. Applicant's representative: Alvin J. Meiklejohn, Jr., Suite 1600 Lincoln Center, 1660 Lincoln Street, Denver, Colo. 80203. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Petroleum and petroleum products*, in bulk, in tank vehicles, (1) from points in Arkansas, Colorado, Kansas, Oklahoma, and that part of Texas on and north of U.S. Highway 66 from the Texas-New Mexico State line to junction U.S. Highway 83, and on and east of U.S. Highway 83 from its junction with U.S. Highway 66 to the boundary line between Texas and Mexico, to points in the United States (except Alaska and Hawaii). The purpose of this filing is to eliminate the gateways of Borger, Chaison or Houston, Etter, Fort Worth, Freeport, Kings Mill, Longview, Sherrin, and Texas City, Tex., and from points in Texas on and north of U.S. Highway 66 to points in New Mexico on and north of U.S. Highway 66, Denver, Jefferson County, and La Junta, Colo., Altus, Ardmore, Cushing, Cyril, Duncan, Ponca City, Sunray, Tulsa, Wynnewood, Okla., points in Oklahoma, and Lawrence, Ulysses, and Wichita, Kans. (2) from Kingsport, Tenn., to points in Oklahoma, Kansas, Colorado, and the part of Texas on and north of U.S. Highway 66 from the Texas-New Mexico state line to Junction U.S. Highway 83, and on and east of U.S. Highway 83 from its junction with U.S. Highway 66 to the boundary line between Texas and Mexico. The purpose of this filing is to eliminate the gateway of Longview, Tex. (3) from Avondale, La., to points in California. The purpose of this filing is to eliminate the gateway of Longview, Tex. (4) from the plant site of Phillips Petroleum Company located at or near Hoag, Nebr., to points in Colorado. The purpose of this filing is to eliminate the gateway of points in Kansas.

No MC 115840 (Sub-No. 104G), filed June 4, 1974. Applicant: COLONIAL FAST FREIGHT LINES, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: E. Stephen Heisley, 666 Eleventh Street NW., Washington, D.C. 20001. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (1) *Iron and steel articles, overhead highway sign structures, highway breakaway posts, highway guardrails, and uprights*, as encompassed by iron and steel mill products, from points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana east of the Mississippi River, to points in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, Pennsylvania (except Wellsboro and Bradford), and Kentucky. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (2) *scrap metals* composed of iron and steel articles and fabricated and structural aluminum, from points in Arkansas and Oklahoma, to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Decatur, Ala. (3) *salt and salt products* (except in bulk), from Anse LaButte, La., to points in Alabama, Georgia, Florida, North Carolina, South Carolina and Tennessee. The purpose of this filing is to eliminate the gateways of Mobile, Montgomery or Birmingham, Ala. (4) *iron and steel articles* (except commodities which because of their size or weight require the use of special equipment), from the facilities of Republic Steel Corp., at Gadsden, Ala., to points in Mississippi, Georgia, Florida, Tennessee, and points in Louisiana east of the Mississippi River, restricted to traffic originating at, and destined to, the named points. The purpose of this filing is to eliminate the gateway of Guntersville, Ala.

(5) (a) *Iron and steel articles*, encompassed in iron and steel mill products, and (b) *iron and steel articles*, which because of their size or weight require the use of special equipment, from the facilities of Republic Steel Corp., at Gadsden, Ala., to points in Georgia, Florida, Mississippi, Tennessee and those points in Louisiana, east of the Mississippi River, restricted to traffic originating at, and destined to, the named points. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (6) *salt* (except in bulk), from Baldwin, La., to points in Florida, Alabama, Georgia, Tennessee, North Carolina and South Carolina. The purpose of this filing is to eliminate the gateways of Mobile, Montgomery or Birmingham, Ala. (7) *iron and steel articles, valves, hydrants, gaskets, overhead highway sign structures, highway breakaway posts, highway guardrails, and uprights* (except in *tures, highway break-away posts, highway guardrails, and uprights* (except in bulk) used in agriculture, water treatment, food processing, wholesale groceries, and institutional supply industries, from points on the Warrior-Tombigbee-Alabama River System, located in Ala-

bama, to points in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, Kentucky and Pennsylvania (except Wellsboro and Bradford, Pa.). The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (8) *cast iron and brass valves and components and cast iron fire hydrafts*, from Anniston, Ala., to points in Texas. The purpose of this filing is to eliminate the gateway of Birmingham, Ala.

(9) *Scrap metals*, the transportation of which because of their size and weight require the use of special equipment, from points in Arkansas and Oklahoma, to points in Georgia, Florida, Tennessee, Mississippi, and Louisiana east of the Mississippi River. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (10) *iron and steel articles* (except commodities which because of size or weight require the use of special equipment), from those points in Alabama located on the Tennessee River, and those points in Louisiana, and Mississippi located on the Mississippi River, and those points in Tennessee located on the Mississippi and Tennessee Rivers on and south of the Kentucky-Tennessee State line, to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Chattanooga, Tenn. (11) *scrap metals*, composed of iron and steel (except commodities which because of size or weight require the use of special equipment), from points in Arkansas and Oklahoma, to points in Alabama, Georgia, Arkansas, Mississippi, Tennessee, and Florida. The purpose of this filing is to eliminate the gateway of Florence, Ala. (12) (a) *iron and steel articles* as encompassed in iron and steel mill products, and (b) *iron and steel articles*, which because of their size or weight require the use of special equipment, from Birmingham, Ala., and points within ten miles thereof, to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Chattanooga, Tenn. (13) *iron and steel articles* (except commodities which because of size or weight require the use of special equipment), from points on the Mississippi and Tennessee Rivers on and south of the Kentucky-Tennessee State line, to points in Kentucky, North Carolina, and South Carolina. The purpose of this filing is to eliminate the gateway of Memphis, Tenn.

(14)(a) *Iron and steel articles* and *contractors' equipment* as encompassed by iron and steel mill products, and (b) *iron and steel articles* and *contractors' equipment*, the transportaion of which because of their size or weight require the use of special equipment, and *related contractors' materials and supplies*, when their transportation is incidental to the transportation of commodities which by reason of size or weight require special equipment (except cement and commodities in bulk), between points in North Carolina and South Carolina, on the one hand, and, on the other, points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana east of the Mississippi River. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (15) *salt and salt mixtures*, as encompassed in *salt products* (except in bulk) and *materials* and supplies used in the agriculture, water treatment, food processing, wholesale groceries and institutional supply industries, when shipped in mixed loads with salt and salt products, from the plantsite of Morton Salt Inc., at Weeks Island, La., to points in Florida, Tennessee, Georgia, South Carolina, North Carolina, and Alabama. The purpose of this filing is to eliminate the gateways of Mobile and Montgomery, Ala. (16) *iron and steel articles*, as encompassed by iron and steel and steel mill products (except commodities which because of size and weight require the use of special equipment; and commodities used in or in connection with discovery, development, production, refining, manufacturing, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products), from points on the Mississippi and Tennessee Rivers on and south of the Kentucky-Tennessee State line, to points in Arkansas and Oklahoma. The purpose of this filing is to eliminate the gateway of Decatur, Ala.

(17) *Salt and salt mixtures*, as encompassed in sale products (except in bulk), from Weeks Island, La., to points in Florida, Georgia, North Carolina, South Carolina, and Tennessee. The purpose of this filing is to eliminate the gateways of Mobile and Montgomery, Ala. (18) *scrap metals*, composed of iron and steel articles, from points in Arkansas and Oklahoma, to points in Kentucky, North Carolina, and South Carolina. The purpose of this filing is to eliminate the gateway of Memphis, Tenn. (19) *iron and steel articles* encompassed by iron and steel mill products, from points in Mississippi, and those in Louisana east of the Mississippi River to points in North Carolina and South Carolina. The purpose of this filing is to elminate the gateway of Birmingham, Ala., and ten miles thereof. (20) *iron and steel articles*, and *fabricated and structural aluminum*, the transportation of which because of their size or weight require the use of special equipment, from points in Mississippi, and those in Louisiana east of the Mississippi River, to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Birmingham, Ala., and ten miles thereof. (21) *valves, hydrants, and gaskets*, from Anniston, Ala., to points in Maine, New Hampshre, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virgina, West Virgnia, and Pennsylvania (except Wellsboro and Bradford, Pennsylvania), and Kentucky. The purpose of this filing is to eliminate the gateway of Birmingham, Ala., and ten miles thereof. (22) *cast iron pipe*, from Coshocton, Ohio, to those points in Oklahoma and Arkansas. The purpose of this filing is to eliminate the gateway of Decatur, Ala.

(23) *Farm implements*, encompassed by iron and steel articles, from Poplarville, Miss., to points in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, Kentucky, and Pennsylvania (except Wellsboro and Bradford, Pa.). The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (24) *Fabricated and structural aluminum articles*, from points in that part of the United States lying on and east of Texas, Oklahoma, Kansas, Nebraska, South Dakota and North Dakota, to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (25) (a) *Farm implements*, encompassed by iron and steel mill products, and (b) *farm implements*, the transportation of which because of their size or weight require the use of special equipment, and *related machinery parts* and *related contractors' materials* and *supplies*, composed of farm implements, when their transportation is incidental to the transportation of the above commodities, which by reason of size or weight require special equipment, from Birmingham, Ala., and points within ten miles thereof, to points in Texas, Arkansas and Oklahoma. The purpose of this filing is to eliminate the gateway of Poplarville, Miss. (26) *Cast, reinforced, and prestressed concrete*, and *concrete products*, the transportation of which because of size or weight require the use of special equipment, from the plant site of Dixie Cast-Stone, Inc., at or near Marietta, Ga., and the plant site of Southern Concrete Products Company at or near Atlanta, Ga., to points in Mississippi, Georgia and those points in Louisiana east of the Mississippi River. The purpose of this filing is to eliminate the gateway of Birmingham, Ala.

(27) *Iron and steel articles* (except in bulk, and except commodities which because of size or weight require the use of special equipments), between points in North Carolina and South Carolina, on one hand, and, on the other, points on the Mississippi and Tennessee Rivers, on and south of the Kentucky-Tennessee State line. The purpose of this filing is to eliminate the gateway of Memphis, Tenn. (28) *farm implements* as encompassed by iron and steel articles (except commodities which because of size or weight require the use of special equipment), from points on the Tennessee and Mississippi Rivers on and south of the Kentucky-Tennessee State line, to points in Alabama, Arkansas, Florida, Georgia, Kentucky, North Carolina, South Carolina, Oklahoma, Tennessee, and Texas. The purpose of this filing is to eliminate the gateway of Poplarville, Miss. (29) *iron and steel articles* (except commodities which because of size or weight require the use of special equipment), from points on the Mississippi and Tennessee Rivers, on and south of the Kentucky-Tennessee State line, to points in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, Kentucky, and

Pennsylvania (except Wellsboro and Bradford, Pa.). The purpose of this filing is to eliminate the gateway of Birmingham, Ala.

(30) *Iron and steel articles, overhead highway sign structures, highway breakaway posts, highway guardrails, and uprights,* the transportation of which because of their size or weight require the use of special equipment, and *related contractors' materials and supplies,* incidental to the commodities requiring special equipment, from points in Florida, Georgia, Tennessee and Mississippi, and those in Louisiana east of the Mississippi River, to points in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, West Virginia, Pennsylvania (except Wellsboro and Bradford, Pa.), and Kentucky. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (31) *aluminum articles,* the transportation of which because of their size or weight require the use of special equipment, between points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana, east of the Mississippi River, on the one hand, and, on the other, points in that part of the United States lying in and east of Texas, Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (32) *iron and steel,* and *iron and steel articles,* as encompassed by iron and steel mill products (except commodities used in or in connection with discovery, development, production, refining, manufacturing, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products, from points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana east of the Mississippi River, to points in Arkansas and Oklahoma. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof.

(33) *Iron and steel articles,* the transportation of which because of their size or weight require the use of special equipment (except commodities used in or in connection with discovery, development, production, refining, manufacturing, processing, storage transmission, and distribution of natural gas and petroleum and their products and their products and by-products) from points in Georgia, Florida, Tennessee, Mississippi and those in Louisiana east of the Mississippi River, to points in Arkansas and Oklahoma. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (34) *iron and steel articles* (except commodities in bulk, and those used in or in connection with discovery, development, production, refining, manufacturing, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products), from points in North Carolina and South Carolina, to points in Arkansas and Oklahoma. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. (35) *materials and supplies* used in the agriculture, water treatment, food processing, wholesales groceries, and institutional supply industries, the transportation of which because of size or weight require the use of special equipment (except in bulk), (a) from points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana east of the Mississippi River, to points in Tennessee, Georgia, North Carolina, South Carolina, Florida, and Alabama. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (b) from points on the Warrior-Tombigbee-Alabama River System, located in Alabama, to points in Mississippi, and those in Louisiana east of the Mississippi River. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. Restriction: The operations authorized herein are restricted against the transportation of traffic from points in Mobile and Baldwin Counties, Alabama, to Memphis, Tennessee, and points in Tennessee within the Memphis, Tenn., Commercial Zone as defined by the Commission.

(36) *Iron and steel mill products,* encompassed by *materials* and *supplies* used in the agriculture, water treatment, food processing, wholesale groceries, and institutional supply industries (except in bulk), (a) from points in Florida, Georgia, Tennessee, Mississippi, and those in Louisiana east of the Mississippi River, to points in Tennessee, Georgia, North Carolina, South Carolina, Florida, and Alabama. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. (b) from points on the Warrior-Tombigbee-Alabama River System, located in Alabama, to points in Mississippi, and those in Louisiana east of the Mississippi River. The purpose of this filing is to eliminate the gateway of Birmingham, Ala. and ten miles thereof. Restriction: The operations authorized herein are restricted against the transportation of traffic from points in Mobile and Baldwin Counties, Ala., to Memphis, Tennessee, and points in Tennessee within the Memphis, Tenn., Commercial Zone as defined by the Commission.

The following letter-notices of proposals to eliminate gateways for the purpose of reducing highway congestion, alleviating air and noise pollution, minimizing safety hazards, and conserving fuel have been filed with the Interstate Commerce Commission under the Commission's *Gateway Elimination* Rules (49 CFR 1065), and notice thereof to all interested persons is hereby given as provided in such rules.

An original and two copies of protests against the proposed elimination of any gateway herein described may be filed with the Interstate Commerce Commission *on or before* July 5, 1975. A copy must also be served upon applicant or its representative. Protests against the elimination of a gateway will *not* operate to stay commencement of the proposed operation.

Successively filed letter-notices of the same carrier under these rules will be numbered consecutively for convenience in identification. Protests, if any, must refer to such letter-notices by number.

No. MC 29886 (Sub-No. E104), filed May 23, 1974. Applicant: DALLAS & MAVIS FORWARDING CO., INC., 4000 W. Sample Street, South Bend, Ind. 46627. Applicant's representative: Charles Pieroni (same as above). Authority sought to operate as a *common carrier,* by motor vehicle, over irregular routes, transporting: *Contractors' machinery and equipment,* the transportation of which because of size or weight, require the use of special equipment or special handling, and *self-propelled articles,* each weighing 15,000 pounds or more, and related machinery, tools, parts, and supplies, moving in connection therewith; (1) between points in Michigan (except those east and south of a line beginning at the Michigan-Ohio State line and extending along U.S. Highway 127 to junction Michigan Highway 46, thence along Michigan Highway 46 to junction Michigan Highway 15, thence along Michigan Highway 15 to Saginaw Bay, on the one hand, on the other, points in Ohio; and (2) between points in Michigan (except those south and east of a line beginning at the Ohio-Michigan State line and extending along U.S. Highway 127 to junction Interstate Highway 94, thence along Interstate Highway 94 east to Lake Erie, on the one hand, and, on the other, those points in Williams, Paulding, Van Wert, Mercer, Darke, Preble, Montgomery, Butler, Warren, Hamilton, Clermont, Brown, and Adams Counties, Ohio, and those in Defiance County, Ohio west of U.S. Highway 66. The purpose of this filing is to eliminate the gateways of points in Michigan on and south of a line extending along the northern boundaries of Allegan, Barry, and Eaton Counties, Mich., thence along Business Route Interstate Highway 96 to Lansing, thence on and west of a line extending along U.S. Highway 127 to Jackson, thence along unnumbered highway (formerly portion U.S. Highway 127) to junction U.S. Highway 12, near Somerset Center, thence along U.S. Highway 12 to junction U.S. Highway 127, near Somerset, thence along U.S. Highway 127 to the Michigan-Ohio State line.

No. MC 29886 (Sub-No. E105), filed May 23, 1974. Applicant: DALLAS & MAVIS FORWARDING CO., INC., 4000 W. Sample Street, South Bend, Ind. 46627. Applicant's representative: Charles Pieroni (same as above). Authority sought to operate as a *common carrier,* by motor vehicle, over irregular routes, transporting: *Self-propelled motor vehicles,* each weighing 15,000 pounds or more, in truckaway service, from points in the lower peninsula of Michigan to points in Alabama, Mississippi, and Florida, those in Georgia in and south of Polk, Haralson, Carroll, Coweta, Pike, Upson, Crawford, Bibb, Twiggs, Laurens, Treutlen, Montgomery, Toombs, Tattnall, Evans, Bryan, and Chatham Counties, and those in Tennessee on and west of a line beginning at the Tennessee-Kentucky State line and extending along Interstate Highway 65 to junction Interstate Highway 24, thence along Interstate Highway 24 to junction U.S. Highway 72, thence along U.S. Highway 72 to the Tennessee-Alabama State line (points in Michigan on and south of a line extending along the northern boundaries of Allegan, Barry, and Eaton Counties, Mich., thence along Business Route Interstate Highway 96 to Lansing, thence on and west of a line extending along U.S. Highway 127 to Jackson, thence along unnumbered highway (formerly portion U.S. Highway 127) to junction U.S. Highway 12, near Somerset Center, thence along U.S. Highway 12 to junction U.S. Highway 127, near Somerset, thence along U.S. Highway 127 to the Michigan-Ohio State line, and South Bend, Ind.)*; and from points in Pennsylvania to points in Arizona, California, Texas, New Mexico, Wyoming, Montana, those in Arkansas on and west of a line beginning at the Arkansas-Missouri State line and extending along U.S. Highway 65 to junction Interstate Highway 40, thence along Interstate Highway 40 to junction U.S. Highway 167, thence along U.S. Highway 167 to the Arkansas-Louisiana State line, those in Louisiana on and west of a line beginning at the Arkansas-Louisiana State line and extending along Louisiana Highway 139 to junction U.S. Highway 165, thence along U.S. Highway 165 to junction U.S. Highway 167, thence along U.S. Highway 167 to the Arkansas-Louisiana State line, those in Louisiana on and west of a line beginning at the Arkansas-Louisiana State line and extending along Louisiana Highway 139 to junction U.S. Highway 165, thence along U.S. Highway 165 to junction U.S. Highway 167, thence along U.S. Highway 167 to the Gulf of Mexico (points in Michigan on and south of a line extending along the northern boundaries of Allegan, Barry, and Eaton Counties, Mich., thence along Business Route Interstate Highway 96 to Lansing, thence on and west of a line extending along U.S. Highway 127 to Jackson, thence along unnumbered highway (formerly portion U.S. Highway 127) to junction U.S. Highway 12, near Somerset Center, thence along U.S. Highway 12 to junction U.S. Highway 127, near Somerset, thence along U.S. Highway 127 to the Michigan-Ohio State line, South Bend, Ind., and points in Texas on and west of U.S. Highway 83)*. The purpose of this filing is to eliminate the gateways indicated by asterisks above.

No. MC 49052 (Sub-No. E4), filed June 3, 1974. Applicant: MACON TRADING POST, INC., 103 Cherry Street, Macon, Ga. 31208. Applicant's representative: Thomas R. Kingsley, 1819 H St. NW., Washington, D.C. 20006. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission: (1) between points in South Carolina, on the one hand, and, on the oher, points in Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Jackson, Washington, Bay, Calhoun, Gulf, Gadsden, Liberty, Franklin, Wakulla, Leon, Jefferson, Madison, Hamilton, Taylor, Suwannee, Lafayette, Dixie, Gilchrist, Levy, Citrus, Hernando, Pasco, Pinellas, Hillsborough, Manatee, Hardee, Sarasota, De Soto, Charlotte, Glades, Lee, Hendry, Collier, Monroe, Dade, Broward, Palm Beach (except points in that portion of Palm Beach north of the West Palm Beach canal) Counties, Fla.; (2) between points in South Carolina (except Jasper and Beaufort Counties), on the one hand, and, on the other, points in Columbia, Baker, Union, Bradford, Alachua, Clay, Putnam, Marion, Sumter, Lake, Polk, Highlands, Okeechobee, Indian River, St. Lucie, Martin, and Palm Beach (except for that portion on and south of the West Palm Beach canal) Counties, Fla.; and (3) between points in South Carolina in and west of Aiken, Lexington, Richland, Kershaw, and Chesterfield Counties, on the one hand, and on the other, points in Florida in and east of Nassau, Duval, St. Johns, Flagler, Volusia, Seminole, Orange, Brevard, and Osceola Counties. The purpose of this filing is to eliminate the gateway of Telfair County, Ga.

No. MC 51146 (Sub-No. E20), filed May 2, 1974. Applicant: SCHNEIDER TRANSPORT, P.O. Box 2298, Green Bay, Wis. 54306. Applicant's representative: D. F. Martin (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such plywood and plywood products, plywood and plywood products* combined with veneer and plastics, *paneling doors*, and *composition wood products* as are materials, equipment, and supplies used in the manufacture and distribution of the same: (1) between North Dakota, on the one hand, and, on the other, points in Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Pennsylvania, West Virginia, Virginia, North Carolina, Tennessee, Kentucky, Ohio, Lower Peninsula of Michigan, Indiana, Wisconsin (except points north and west of a line beginning at Marinette, Wis., and extending along Wisconsin Highway 64 to junction U.S. Highway 51, thence along U.S. Highway 51 to the Wisconsin-Illinois State line), Illinois (except points west of a line beginning at the Wisconsin-Illinois State line and extending along Illinois Highway 26 to junction Illinois Highway 29, thence along Illinois Highway 29 to junction U.S. Highway 66, thence along U.S. Highway 66 to the Illinois-Missouri State line), and the District of Columbia; and (2) between South Dakota, on the one hand, and, on the other, points in Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, West Virginia, Virginia, North Carolina (except points on U.S. Highway 25), Pennsylvania (except points north and west of U.S. Highway 62), New York (except points west of a line beginning at Lake Erie at Barcelona, N.Y., and extending along New York Highway 17 to junction U.S. Highway 62, thence along U.S. Highway 62 to the New York-Pennsylvania State line), and the District of Columbia. The purpose of this filing is to eliminate the gateway of Marshfield, Wis.

No. MC 52579 (Sub-No. E7), filed May 19, 1974. Applicant: GILBERT CARRIER CORPORATION, One Gilbert Drive, Secaucus, N.J. 07094. Applicant's representative: Fred L. Cardascia (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Garments*, on hangers, from St. Louis, Mo., to points in Connecticut, Delaware, District of Columbia, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island, Vermont, Wisconsin, points in Illinois north of U.S. Highway 30, points in Indiana north of U.S. Highway 30, points in Maryland on and east of U.S. Highway 522, points in Ohio north of U.S. Highway 30 which are east of Ohio Highway 4, and points in Pennsylvania north of U.S. Highway 80 which are east of U.S. Highway 15. The purpose of this filing is to eliminate the gateway of Chicago, Ill.

No. MC 60014 (Sub-No. E1), filed June 4, 1974. Applicant: AERO TRUCKING INC., P.O. Box 308, Monroeville, Pa. 15146. Applicant's representative: A. Charles Tell, 100 East Broad St., Columbus, Ohio 43215. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such commodities*, as building contractor's equipment, heavy and bulky articles, machinery and machine parts, and articles requiring specialized handling or rigging, between points in Wisconsin, on the one hand, and, on the other, points in Maryland. The purpose of this filing is to eliminate the gateway of Columbiana, Cuyahoga, Mahoning, Summit, and Trumbull Counties, Ohio.

No. MC 63792 (Sub-No. E10), filed June 4, 1974. Applicant: TOM HICKS TRANSFER COMPANY, INC., P.O. BOX 16006, Houston, Tex. 77022. Applicant's representative: C. W. Ferebee (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Iron and steel articles* which because of size and weight require the use of special equipment to load, unload, or transport, (a) between points in that part of Louisiana and Mississippi on and south of a line beginning at the Louisiana-Texas State line and extending along Louisiana Highway 8 to junction Louisiana Highway 28, thence along Louisiana Highway 28 to junction U.S. Highway 84, thence along U.S. Highway 84 to Mississippi to junction U.S. Highway 61, thence along U.S. Highway 61 to junction Mississippi Highway 28, thence along Mississippi Highway 28 to junction Mississippi Highway 550, thence along Mississippi Highway 550 to junction U.S. Highway 84, thence along U.S. Highway 84 to the Mississippi-Alabama State line, on the one hand, and, on the other, points in that part of Texas on and west of a line beginning at Interstate Highway 45 extending along Interstate Highway 10 to junction Texas Highway 71, thence along Texas Highway 71 to junction U.S. Highway 283, thence along U.S. Highway 283 to junction U.S. Highway 84, thence along U.S. Highway 84 to junction U.S. Highway 83, thence along U.S. Highway 83 to junction U.S. Highway 82, thence along U.S. Highway 82 to junction Interstate Highway 27, thence along Interstate Highway 27 to junction U.S. Highway 287, thence along U.S. Highway 287 to the Texas-Oklahoma State line.

(b) between points in that part of Louisiana and Mississippi on and south of Interstate Highway 20, on the one hand, and, on the other, points in that part of Texas on and south of a line beginning at Galveston on Interstate Highway 45 to Houston, thence along Interstate Highway 10 to junction U.S. Highway 290, thence along U.S. Highway 290 to junction U.S. Highway 285, thence along U.S. Highway 285 to junction Interstate Highway 20, thence along Interstate Highway 20 to junction U.S. Highway 80, thence along U.S. Highway 80 to the Texas-New Mexico State line, (c) between points in that part of Louisiana and Mississippi on and south of a line beginning at the Louisiana-Texas State line on Interstate Highway 10 and extending along Interstate Highway 10 to junction U.S. Highway 167, thence along U.S. 167 to junction U.S. Highway 190, thence along U.S. Highway 190 to junction U.S. Highway 90, thence along U.S. Highway 90 to the Mississippi-Alabama State line, on the one hand, and, on the other, points in that part of Texas lying on and west of a line extending along Interstate Highway 45 to junction U.S. Highway 75, thence along U.S. Highway 75 to the Texas-Oklahoma State line, (d) from points in that part of Louisiana and Mississippi on and south of a line beginning at the Louisiana-Texas State line extending along Louisiana Highway 6 to junction U.S. Highway 84, thence along U.S. Highway 84 to junction U.S. Highway 61, thence along U.S. Highway 61 to junction Mississippi Highway 18, thence along Mississippi Highway 18 to junction Interstate Highway 20, thence along Interstate Highway 20 to the Mississippi-Alabama State line to points in New Mexico, (e) from points in Mississippi on and south of Interstate Highway 20 to points in that part of New Mexico on and south of a line beginning at the New Mexico-Texas State line extending along U.S. Highway 380 to junction Interstate Highway 25, thence along Interstate Highway 25 to junction U.S. Highway 60, thence along U.S. Highway 60 to the New Mexico-Arizona State line.

(f) from points in that part of Louisiana and Mississippi on and south of a line beginning at the Louisiana-Texas State line extending along Interstate Highway 10 to junction U.S. Highway 167, thence along U.S. Highway 167 to junction U.S. Highway 190, thence along U.S. Highway 190 to junction U.S. Highway 90, thence along U.S. Highway 90 to the Mississippi-Alabama State line to points in Oklahoma on and west of Interstate Highway 35, (g) from points in that part of Louisiana on and south of a line beginning at the Texas-Louisiana State line extending along Interstate Highway 10 to junction U.S. Highway 90, thence along U.S. Highway 90 to junction Louisiana Highway 14, thence along Louisiana Highway 14 to junction Louisiana Highway 83, thence along Louisiana Highway 83 to its southern most point at Louisa, La., to points in Oklahoma on and west of a line beginning at the Oklahoma-Texas State line extending along Interstate Highway 35 to junction U.S. Highway 70, thence along U.S. Highway 70 to junction U.S. Highway 177, thence along U.S. Highway 177 to junction Oklahoma Highway 7, thence along Oklahoma Highway 7 to junction Oklahoma Highway 1, thence along Oklahoma Highway 1 to junction U.S. Highway 75, thence along U.S. Highway 75 to the Oklahoma-Kansas State line, (h) from points in that part of Louisiana and Mississippi on and south of a line beginning at the Louisiana-Texas State line and extending along Louisiana Highway 8 to junction Louisiana Highway 1, thence along Louisiana Highway 1 to junction Louisiana Highway 28, thence along Louisiana Highway 28 to junction U.S. Highway 84, thence along Louisiana Highway 84 to junction U.S. Highway 98, thence along U.S. Highway 98 to junction Mississippi Highway 42, thence along Mississippi Highway 42 to the Mississippi-Alabama State line to points in that part of Kansas on and west of a line beginning at the Kansas-Oklahoma State line extending along U.S. Highway 54 to junction U.S. Highway 183, thence along U.S. Highway 183 to junction U.S. Highway 56, thence along U.S. Highway 56 to junction U.S. Highway 281, thence along U.S. Highway 281 to the Oklahoma-Nebraska State line, (i) from points in that part of Mississippi on and south of U.S. Highway 90 to points in that part of Kansas on and west of a line beginning at a point on the Kansas-Oklahoma State line extending along U.S. Highway 169 to junction U.S. Highway 160, thence along U.S. Highway 160 to junction U.S. Highway 75, thence along U.S. Highway 75 to junction Kansas Highway 96, thence along Kansas Highway 96 to junction U.S. Highway 77, thence along U.S. Highway 77 to the Kansas-Nebraska State line.

(j) from points in that part of Louisiana on and south of a line beginning at the Louisiana-Texas State line and extending along Interstate Highway 10 to junction U.S. Highway 90, thence along U.S. Highway 90 to the Louisiana-Mississippi State line to points in that part of Kansas on and west of a line beginning at the Kansas-Oklahoma State line extending along U.S. Highway 169 to junction U.S. Highway 59, thence along U.S. Highway 59 to junction Kansas Highway 68, thence along Kansas Highway 68 to junction U.S. Highway 75, thence along U.S. Highway 75 to the Kansas-Nebraska State line, (k) from points in that part of Louisiana on and south of a line beginning at the Louisiana-Texas State line extending along Interstate Highway 10 to junction U.S. Highway 90, thence along U.S. Highway 90 to junction Interstate Highway 83 to Louisa, La., its southern most point to points in that part of Kansas on and west of a line beginning at the Kansas-Oklahoma State line extending along U.S. Highway 169 to junction Kansas Highway 39, thence along Kansas Highway 39 to junction Kansas Highway 7, thence along Kansas Highway 7 to junction U.S. Highway 69, thence along U.S. Highway 69 to junction U.S. Highway 54, thence along U.S. Highway 54 to the Kansas-Missouri State line, (l) between points in that part of Texas lying on and south of a line beginning at Interstate Highway 45 and extending to junction Interstate Highway 10, thence along Interstate Highway 10 to junction U.S. Highway 90, thence along U.S. Highway 90 to the United States-Mexico International Boundary line, on the one hand, and, on the other, points in Arkansas, (h) from points in that part of Texas lying on and south of a line beginning at the Louisiana-Texas State line extending along Interstate Highway 10 to junction U.S. Highway 59, thence along U.S. Highway 59 to Laredo, to points in Oklahoma on and west of a line beginning at the Oklahoma State line and extending along Interstate Highway 44 to junction U.S. Highway 75, thence along U.S. Highway 75 to the Oklahoma-Kansas State line.

(n) from points in that part of Texas on and south of a line beginning at the Louisiana-Texas State line and extending along U.S. Highway 69 to junction U.S. Highway 190, thence along U.S. Highway 190 to junction Texas Highway 30, thence along Texas Highway 30 to junction Texas Highway 90, thence along Texas Highway 90 to junction U.S. Highway 290, thence along U.S. Highway 290 to junction U.S. Highway 77, thence along U.S. Highway 77 to the United States-Mexico International Boundary line to points in that part of Kansas on and north of a line in Kansas beginning at the Kansas-Oklahoma State line and extending along U.S. Highway 54 to junction Kansas Highway 96, thence along Kansas Highway 96 to junction Kansas Highway 39, thence along Kansas Highway 39 to junction U.S. Highway 69, thence along U.S. Highway 69 to junction U.S. Highway 54, thence along U.S. Highway 54 to the Kansas-Missouri State line, (o) from points in that part of Texas lying on and south of a line beginning at the Louisiana-Texas State line extending along Texas Highway 30 to junction Texas Highway 6, thence along Texas Highway 6 to junction Texas Highway 159, thence along Texas Highway 159 to junction Texas Highway 36, thence along Texas Highway 36 to Freeport, Tex., to points in New Mexico, and (p) between points in that part of Texas on and south of a line beginning at the Texas-Louisiana State line and extending along Texas Highway 63 to junction Interstate Highway 59, thence along Interstate Highway 59 to junction Texas Highway 288, thence along Texas Highway 288 to Freeport, Tex., on the one hand, and, on the other, points in that part of Texas on and south of a line beginning at the United States-Mexico International Boundary line and extending along U.S. Highway 281 to junction Texas Highway 9, thence along Texas Highway 9 to junction Interstate Highway 37, thence along Interstate Highway 37 to its ending at Corpus Christi, Tex. The purpose of this filing is to eliminate the gateways of Houston or Baytown, Tex.

No. MC 72243 (Sub-No. E1), filed May 30, 1974. Applicant: AETNA FREIGHT LINES, INC., P.O. Box 350, Warren, Ohio 44482. Applicant's representative: Edward G. Villalon, Suite 1032 Pennsylvania Bldg., Pennsylvania Ave. & 13th St. N.W., Washington, D.C. 20004. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Iron, steel*, and *iron and steel articles*, restricted to commodities which because of size or weight require the use of special equipment, between points is Mississippi, Arkansas, Louisiana, and Alabama, on the one hand, and, on the other, points in New York, restricted against (1) shipments originating at Anniston, Birmingham, Decatur, Gadsden, Tuscaloosa, Ala., or points within ten miles thereof, (2) aircraft and missiles, and parts thereof, and (3) pipe, pipeline dope, and valves used in connection with pipelines. The purpose of this filing is to eliminate the gateway of points in the Cincinnati, Ohio, commercial zone which are in Kentucky.

No. MC 75110 (Sub-No. E22), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Frances Jabet, 1776 Broadway, New York, N.Y. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the commission, between points in Missouri east of U.S. Highway 63 and north of Interstate Highway 70, on the one hand, and, on the other, points in Arkansas south and east of U.S. Highway 67. The purpose of this filing is to eliminate the gateway of points within a 25 mile radius of St. Louis, Mo.

No. MC 75110 (Sub-No. E27), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Frances Jabet, 1776 Broadway, New York, N.Y. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Illinois within 25 miles of St. Louis, Mo., on the one hand, and, on the other, points in Oklahoma on and north of U.S. Highway 60 and on and west of U.S. Highway 183. The purpose of this filing is to eliminate the gateway of points within 20 miles of Clay Center, Kans., points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E28), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Illinois on and north of U.S. Highway 66, on the one hand, and, on the other, points in Texas. The purpose of this filing is to eliminate the gateway of points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E29), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Iowa on and north of Interstate Highway 80, on the one hand, and, on the other, points in Illinois on and south of U.S. Highway 50 and on and east of Interstate Highway 57. The purpose of this filing is to eliminate the gateway of points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E30), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Arkansas, on the one hand, and, on the other, points in Illinois on and north of Interstate Highway 70. The purpose of this filing is to eliminate the gateway of points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E31), filed May 11, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Colorado, on the one hand, and, on the other, points in Indiana. The purpose of this filing is to eliminate the gateway of points within 20 miles of Clay Center, Kans., points within 25 miles of Kansas City, Kans., and points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E32), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Nebraska on or west of U.S. Highway 83, on the one hand, and, on the other, points in Indiana on or south of U.S. Highway 50. The purpose of this filing is to eliminate the gateways of points within 20 miles of Clay Center, Kans., points within 25 miles of Kansas City, Kans., and points within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E33), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Nebraska on and west of U.S. Highway 83, on the one hand, and, on the other, points in Ohio. The purpose of this filing is to eliminate the gateways of points within 20 miles of Clay Center, Kans., within 25 miles of Kansas City, Kans., and within 25 miles of St. Louis, Mo.

No. MC 75110 (Sub-No. E34), filed May 16, 1974. Applicant: ATLANTIC & PACIFIC MOVING CO., P.O. Box 25085, Oklahoma City, Okla. 73125. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Household goods*, as defined by the Commission, between points in Illinois on and west of Interstate Highway 57 and on and south of Interstate Highway 70, on the one hand, and, on the other, points in Ohio. The purpose of this filing is to eliminate the gateway of points within 25 miles of St. Louis, Mo.

No. MC 78228 (Sub-No. E16), filed June 4, 1974. Applicant: J. MILLER EXPRESS, INC., 152 Wabash Street, Pittsburgh, Pa. 15220. Applicant's representative: John M. Rumin, Wick, Vuono, & Lavelle, 2310 Grant Building, Pittsburgh, Pa. 15219. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Pig iron and coke*, in dump vehicles, from points in that part of Ohio on and south of a line beginning at the Ohio-West Virginia State line and extending along U.S. Highway 40 to junction Ohio Highway 29, thence along Ohio Highway 29 to the Ohio-Indiana State line, to points in that part of New York on and east of New York Highway 19, restricted against the transportation of materials used by steel mills from points in Jackson and Washington Counties, Ohio. The purpose of this filing is to eliminate the gateway of Pittsburgh, Pa.

No. MC 78228 (Sub-No. E17), filed June 4, 1974. Applicant: J. MILLER EXPRESS, INC., 152 Wabash Street, Pittsburgh, Pa. 15220. Applicant's representative: John M. Rumin, Wick, Vuono, & Lavelle, 2310 Grant Building, Pittsburgh, Pa. 15219. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Coke*, in dump vehicles, fom Harriet, Tonawanda Township, N.Y., to Virginia, West Virginia and that part of

Maryland south of a line beginning at the Maryland-Virginia State line on U.S. Highway 495 and extending along U.S. Highway 495 to junction U.S. Highway 50, thence along U.S. Highway 50 to junction Maryland Highway 404, thence along Maryland Highway 404 to the Maryland-Delaware State line and the Maryland Counties of Allegany and Garrett, with no transportation for compensation on return except as otherwise authorized. The purpose of this filing is to eliminate the gateway of Pittsburgh, Pa.

No. MC 78228 (Sub-No. E18), filed June 4, 1974. Applicant: J. MILLER EXPRESS, INC., 152 Wabash Street, Pittsburgh, Pa. 15220. Applicant's representative: John M. Rumin, Wick, Vuono, & Lavelle, 2310 Grant Building, Pittsburgh, Pa. 15219. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Pig iron and coke*, in dump vehicles, from points in Ohio to points in that part of New York on and south of a line beginning at the Pennsylvania-New York State line and extending along New York Highway 97 to junction New York Highway 17B, thence along New York Highway 17B to junction New York Highway 42, thence along New York Highway 42 to junction New York Highway 52, thence along New York Highway 52 to junction U.S. Highway 209, thence along U.S. Highway 209 to junction Interstate Highway 87, thence along Interstate Highway 87 to junction New York Highway 23A, thence along New York Highway 23A to junction New York Highway 23, thence along New York Highway 23 to the New York-Massachusetts State line, restricted against the transportation of materials used by steel mills from points in Jackson and Washington Counties, Ohio. The purpose of this filing is to eliminate the gateway of Pittsburgh, Pa.

No. MC 78228 (Sub-No. E19), filed June 4, 1974. Applicant: J. MILLER EXPRESS, INC., 152 Wabash Street, Pittsburgh, Pa. 15220. Applicant's representative: John M. Rumin, Wick, Vuono, & Lavelle, 2310 Grant Building, Pittsburgh, Pa. 15219. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Pig iron and coke*, in dump vehicles, from points in that part of Ohio on and south of a line beginning at the Ohio-Pennsylvania State line and extending along Ohio Highway 82 to junction Ohio Highway 91, and thence along Ohio Highway 91 to Lake Erie, to points in that part of New York on, south and east of a line beginning at the New York-Pennsylvania State line and extending along U.S. Highway 11 to junction New York Highway 12, thence along New York Highway 12 to junction New York Highway 23, thence along New York Highway 23 to junction New York Highway 7, thence along New York Highway 7 to the New York-Vermont State line, restricted against the transportation of materials used by steel mills from points in Jackson and Washington Counties, Ohio. The purpose of this filing is to eliminate the gateway of Pittsburgh, Pa.

No. MC 78228 (Sub-No. E20), filed June 4, 1974. Applicant: J. MILLER EXPRESS, INC., 152 Wabash Street, Pittsburgh, Pa. 15220. Applicant's representative: John M. Rumin, Wick, Vuono & Lavelle, 2310 Grant Building, Pittsburgh, Pa. 15219. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Pig iron and coke*, in dump vehicles, from points in Brooke, Hancock and Marshall Counties, W. Va., to points in that part of Michigan on, north and west of a line beginning at Bay City, Mich., and extending along Michigan Highway 10 to junction Michigan Highway 20, thence along Michigan Highway 20 to junction U.S. Highway 27, thence along U.S. Highway 27 to junction Michigan Highway 46, thence along Michigan Highway 46 to junction U.S. Highway 131, thence along U.S. Highway 131 to junction Michigan Highway 21, thence along Michigan Highway 21 to junction U.S. Highway 31, thence along U.S. Highway 31 to junction Interstate Highway 94, thence along Interstate Highway 94 to Lake Michigan at or near Stevensville, Mich. The purpose of this filing is to eliminate the gateway of Pittsburgh, Pa.

No. MC 82063 (Sub-No. E3) (Correction), filed June 4, 1974, published in the Federal Register January 2, 1975. Applicant: KLIPSCH HAULING CO., 119 East Laughborough, St. Louis, Mo. 63111. Applicant's representative: E. Stephen Heisley, 666 11th St. NW., Washington, D.C. 20001. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Liquid sulphur trioxide*, in bulk, in tank vehicles, from points in St. Louis, Mo.-East St. Louis, Ill., commercial zone, (1) to points in Alabama, Colorado, Illinois, Indiana, Kansas, Michigan, Mississippi, Missouri, Ohio, South Carolina, and Wisconsin (Fairmont City, Ill.*); (2) to points in Oklahoma, Texas (except points in Harris County) and points in Arkansas on and west of a line beginning at the Missouri-Arkansas State line extending along U.S. Highway 65 to junction Arkansas Highway 81, thence along Arkansas Highway 81 to the Arkansas-Louisiana State line (Fairmont City, Ill., and Springfield and Verona, Mo.*); and (3) to points in Louisiana on and west of a line beginning at the Mississippi-Louisiana State line extending along Interstate Highway 55 to junction U.S. Highway 51, thence along U.S. Highway 51 to junction Interstate Highway 10, thence along Interstate Highway 10 to junction Louisiana Highway 23, thence along Louisiana Highway 23 to the Gulf of Mexico (Fairmont City, Ill., and Verona and Pine Bluff, Ark.*). The purpose of this filing is to eliminate the gateways indicated by the asterisks above. The purpose of this filing is to clarify the descriptions.

No. MC 95540 (Sub-No. E290) (Correction), filed May 9, 1974, published in the Federal Register June 21, 1974. Applicant: WATKINS MOTOR LINES, INC., P.O. Box 1636, Atlanta, Ga. 30301. Applicant's representative: Clyde W. Carver, Suite 212, 5299 Roswell Rd. NE., Atlanta, Ga. 30342. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Frozen foods*, from Buffalo, N.Y., to points in Colorado on and south of a line beginning at the Colorado-Utah State line and proceeding east along U.S. Highway 40 to junction U.S. Highway 34, thence along U.S. Highway 34 to the Colorado-Kansas State line. The purpose of this filing is to eliminate the gateway of points in Tennessee (except Memphis, Tenn., and points in the commercial zone thereof). The purpose of this correction is to correct a highway description.

No. MC 107295 (Sub-No. E209) (Correction), filed May 9, 1974, published in the Federal Register April 10, 1975. Applicant: PRE-FAB TRANSIT CO., P.O. Box 146, Farmer City, Ill. 61842. Applicant's representative: Dale L. Cox (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Buildings*, complete, knocked down, or in sections; (4) from points in that part of Iowa located in and south of Decatur, Clarke, Lucas, Monroe, Wapello, Jefferson, Washington, Louisa, Muscative, and Scott Counties to points in North Dakota. The purpose of this filing is to eliminate the gateway of points in Wapello County, Iowa. The purpose of this partial correction is to correct a typographical error in (4) above. The remainder of this letter-notice remains as previously published.

No. MC 107295 (Sub-No. E225) (Correction), filed May 9, 1974, published in the Federal Register April 28, 1975. Applicant: PRE-FAB TRANSIT CO., P.O. Box 146, Farmer City, Ill. 61842. Applicant's representative: Richard D. Vollmer (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Pre-fabricated buildings*, complete, knocked down or in sections; (1) from points in Mississippi to points in Arizona, California, Colorado, Idaho, Iowa, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming, points in that part of Oklahoma in and west of Washington, Tulsa, Creek, Lincoln, Oklahoma, Canadian, Grady, Comanche, and Tillman Counties, and points in that part of Texas in and west of Wilbarger, Foard, Knox, Stonewall, Fisher, Mitchell, Sterling, Reagan, Crockett, and Terrell Counties (Pine Bluff, Ark.)*; and (2) from points in Mississippi to points in Delaware and New Jersey (points in Arkansas and Tennessee)*. The purpose of this filing is to eliminate the gateways indicated by asterisks above. The purpose of this correction is to correct the origin territories in (1) above.

No. MC 107295 (Sub-No. E227) (Correction), filed May 9, 1974, published in the Federal Register April 29, 1975. Applicant: PRE-FAB TRANSIT CO., P.O. Box 146, Farmer City, Ill. 61842. Applicant's representative: Richard D. Vollmer (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Buildings*, complete, knocked down, or in sections; (1) from points in Illinois to points in that part of Arizona in and south of Yuma, Maricopa, Gila, Graham, and Greenlee Counties, points in that part of California in and south of Santa Barbara, Kern, and San Bernardino Counties, and points in that part of New Mexico in and south of Catron, Socorro, Lincoln, Chaves, and Lea Counties (Pine Bluff, Ark.)*; (4) from points in Illinois to points in Delaware, Maryland, New Jersey, points in that part of Virginia in and east of Alleghany, Botetourt, Bedford, Campbell, Charlotte, and Mecklenberg Counties, points in that part of West Virginia in and east of Wood, Wirt, Calhoun, Braxton, Webster, Greenbrier, and Monroe Counties, and the District of Columbia (points in Ohio)*; and (6) from points in that part of Illinois in and north of Adams, Brown, Cass, Sangamon, Christian, Shelby, Moultrie, Douglas, and Edgar Counties to points in that part of South Carolina in and east of Lancaster, Kershaw, Richland, Calhoun, Orangeburg, and Barnwell Counties (points in Ohio and Lumberton, N.C.)*. The purpose of this filing is to eliminate the gateways indicated by asterisks above. The purpose of this partial correction is to correct a typographical error in (1) and (4), and to correct the destination territories in (6) above. The remainder of this letter-notice remains as previously published.

No. MC 111401 (Sub-No. E21) (Correction), filed May 12, 1974, published in the Federal Register June 6, 1975. Applicant: GROENDYKE TRANSPORT, INC., P.O. Box 632, Enid, Okla. 73704. Applicant's representative: Victor R. Comstock (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Petroleum based synthetic plastics*, in bulk, not in liquid form, and *petrochemicals*, in bulk, in tank vehicles, from points in Texas on and south of Interstate Highway 20 and on and east of Interstate Highway 45, to points in California, Michigan, Minnesota, Nebraska, Oregon, Washington, and Wisconsin. The purpose of this filing is to eliminate the gateway of Longview, Tex. The purpose of this correction is to reflect the destination States.

No. MC 111401 (Sub-No. E85) (Correction), filed May 4, 1975, published in the Federal Register, May 23, 1975, and republished June 9, 1975. Applicant: GROENDYKE TRANSPORT, INC., P.O. Box 632, Enid, Okla. 73701. Applicant's representative: Victor R. Comstock (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Petroleum products* (except lubricating oils), in bulk, in tank vehicles, from points in Oklahoma on and north of Interstate Highway 40 and on and west of U.S. Highway 75 to points in Alabama, Kentucky, Louisiana, Mississippi, and Tennessee, restricted against the transportation of (1) liquefied petroleum gases and natural gasoline to points in Mississippi, and (2) liquid wax from Tulsa, Okla., to points in Kentucky and Tennessee. The purpose of this filing is to eliminate the gateways of Ardmore, Cleveland, Cushing, Duncan, Tulsa, and Wynnewood, Okla. The purpose of this correction is to include the restrictions.

No. MC 111812 (Sub-No. E22) (Correction), filed May 17, 1974, published in the Federal Register September 10, 1974. Applicant: MIDWEST COAST TRANSPORT, INC., P.O. Box 1233, Sioux Falls, S. Dak. 57101. Applicant's representative: R. H. Jinks (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *General commodities* (except those of unusual value, Classes A and B explosives, household goods as defined by the Commission, motion picture film, motion picture projection parts, advertising material, tickets, commodities in bulk, those injurious or contaminating to other lading, and those requiring special equipment), from points in Massachusetts and Connecticut to Sioux Falls, S. Dak., and points in Audubon, Buena Vista, Calhoun, Carroll, Cass, Cerro Gordo, Cherokee, Clay, Crawford, Dickinson, Emmit, Fremont, Hancock, Harrison, Humboldt, Ida, Kossuth, Lyon, Mills . . . etc. The purpose of this filing is to eliminate the gateways of Lakefield, Minn., and points within 25 miles thereof. The purpose of this correction is to extend the territorial description.

No. MC 112539 (Sub-No. E1), filed June 4, 1974. Applicant: PERCHAK TRUCKING, INC., P.O. Box 811, Hazelton, Pa. 18201. Applicant's representative: Kenneth R. Davis, 999 Union Street, Taylor, Pa. 18517. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Scrap metal*, in dump vehicles and *scrap railroad rails*, from points in Warren, Burlington, Hunterdon, Union (except Rahway, Clark, Linden, Rozelle, Elizabeth and Plainfield), Bergen Essex (except Newark), Passaic, Middlesex (except Carteret, Woodbridge and Perth Amboy), Monmouth, Somerset, Camden, Mercer, Hudson and Morris (except Dover) Counties, N.J., to points in Allegheny County, Pa. The purpose of this filing is to eliminate the gateway of points in Northampton County, Pa.

No. MC 113459 (Sub-No. E77), filed May 31, 1974. Applicant: H. J. JEFFRIES TRUCK LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert A. Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (1) *Commodities*, the transportation of which, by reason of size or weight, require the use of special equipment, restricted against the transportation of agricultural machinery and agricultural tractors; (2) *Self-propelled articles*, each weighing 15,000 pounds or more, and related machinery, tools, parts, and supplies when moving in connection therewith, restricted to commodities which are transported on trailers; between points in Minnesota on and east of U.S. Highway 53 beginning at the United States-Canada International Boundary line to junction U.S. Highway 61, thence along U.S. Highway 61 to junction Interstate Highway 90, thence along Interstate Highway 90 to the Minnesota-Wisconsin State line, on the one hand, and, on the other, points in Oklahoma on and south of U.S. Highway 66 beginning at the Oklahoma-Kansas State line to junction Interstate Highway 35, thence along Interstate Highway 35 to junction U.S. Highway 62, thence along U.S. Highway 62 to the Oklahoma-Kansas State line. The purpose of this filing is to eliminate the gateway of Sterling, Ill.

No. MC 113459 (Sub-No. E109), filed May 14, 1974. Applicant: H. J. JEFFRIES TRUCK LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (1) *Commodities*, the transportation of which, by reason of size or weight, require the use of special equipment (except farm machinery); (2) *Self-propelled articles*, each weighing 15,000 pounds or more, and related machinery, tools, parts, and supplies when moving in connection therewith, restricted to commodities which are transported on trailers; (3) *Machinery, equipment, materials*, and *supplies* used in, or in connection with, the discovery, development, production, refining, manufacture, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products (except the stringing and picking up of pipe in connection with main or trunk pipe lines; (4) *Machinery, equipment, materials*, and *supplies* used in, or in connection with, the construction, operation, repair, servicing, maintenance, and dismantling of pipelines, other than pipelines used for the transmission of natural gas, petroleum, their products, and by-products, water or sewerage, restricted to the transportation of shipments moving essing, storage, transmission, and dis- *Earth drilling machinery and equipment*, and *machinery, equipment, materials, supplies*, and *pipe* incidental to, used in, or in connection with, (a) the transportation, installation, removal, operation, repair, servicing, maintenance, and dismantling of drilling machinery and equipment, (b) the completion of holes or wells drilled, (c) the production, storage, and transmission of commodities resulting from drilling operations at well or hole sites, and (d) the injection or removal of commodities into or from holes or wells; and (6) *Parts* of commodities, which, by reason of size or weight, require the use of special equipment, either when incidental to the transportation of such commodities, or when transported as separate and unrestricted shipments; between points in Kansas on and south of a line beginning at the Kansas-Colorado State line and extending along U.S. Highway 50, to junction U.S. Highway 156, thence along U.S. Highway 156 to junction U.S. Highway 40, thence along U.S. Highway 40 to junction U.S. Highway 77, thence along U.S. Highway 77 to junction Kansas Highway 18, thence along Kansas Highway 18 to junction U.S. Highway 24, thence along U.S. Highway 24 to junction U.S. Highway 59, thence along U.S. Highway 59 to the Kansas-Missouri State line, on the one hand, and, on the other, all points in Utah. The purpose of this filing is to eliminate the gateway of points in Oklahoma.

No. MC 113459 (Sub-No. E110), filed May 14, 1974. Applicant: H. J. JEFFRIES TRUCKING LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Machinery, equipment, materials*, and *supplies* used in, or in connection with, the discovery, development, production, refining, manufacture, processing, storage, transmission, and distribution of natural gas and their products and by-products, except in connection with main or trunk pipelines, and machinery, equipment, materials, and supplies used in, or in connection with, the construction, operation, repair, servicing, maintenance, and dismantling of pipelines, except in connection with main or trunk pipelines, between points in Nebraska, on the one hand, and, on the other, points in Nevada. The purpose of this filing is to eliminate the gateway of points in Nebraska west of U.S. Highway 83, and those in Colorado east of U.S. Highway 87.

No. MC 113459 (Sub-No. E111), filed May 14, 1974. Applicant: H. J. JEFFERIES TRUCK LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Earth drilling machinery and equipment and machinery, equipment, materials, supplies, and pipe*, due to size or weight, require the use of special equipment, incidental to, used in, or in connection with (a) the transportation, installation, removal, operation, repair, servicing, maintenance, and dismantling of drilling machinery and equipment, (b) the completion of holes or wells drilled, (c) the production, storage, and transmission of commodities resulting from drilling operations at well or hole sites, and (d) the injection or removal of commodities into or from holes or wells; between Bullitt, Hardin, Meade, Breckinridge, Crittenden, Hancock, Daviess, Henderson, Union, Webster, McLean, Hopkins, Ohio, Grayson, Edmonson, Hart, Warren, Butler, Muhlenberg, Logan, Todd, Christian, Trigg, Simpson, Lyon, Caldwell, and Jefferson Counties, Ky., on the one hand, and, on the other, points in Nebraska. The purpose of this filing is to eliminate the gateway of Sterling, Ill., and points in Illinois south of U.S. Highway 36.

No. MC 113459 (Sub-No. E112), filed May 14, 1974. Applicant: H. J. JEFFRIES TRUCK LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (A) *Commodities*, the transportation of which, by reason of size or weight, require the use of special equipment; (B) *self-propelled articles*, each weighing 15,000 pounds or more, and related machinery, tools, parts and supplies when moving in connection therewith, restricted to commodities which are transported on trailers; (C) *earth drilling machinery and equipment, and machinery, equipment, materials, supplies and pipe* incidental to, used in, or in connection with: (1) the transportation, installation, removal, operation, repair, servicing, maintenance, and dismantling of drilling machinery and equipment, (2) the completion of holes or wells drilled, (3) the production, storage and transmission of commodities resulting from drilling operations at well or hole sites and (4) the injection or removal of commodities into or from holes or wells; (D) *parts of commodities*, which, by reason of size or weight, require the use of special equipment, either when incidental to the transportation of such commodities, or when transported as separate and unrestricted shipments; (E) *machinery*, equipment, materials and supplies used in, or in connection with, the discovery, development, production, refining, manufacture, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products, except the stringing and picking up of pipe in connection with main or trunk pipe lines; and (F) *machinery, equipment, materials and supplies* used in, or in connection with, the construction, operation, repair, servicing, maintenance and dismantling of pipe lines, other than pipe lines used for the transmission of natural gas, petroleum, their products and by-products, water or sewerage, restricted to the transportation of shipments moving to or from pipe line rights-of-way, between points in Kansas on and south of U.S. Highway 50 beginning at the Kansas-Colorado State line to its junction with U.S. Highway 154, thence southeast to its junction with U.S. Highway 54, thence along U.S. Highway 54 to the Kansas-Missouri State line, on the one hand, and, on the other, points in South Dakota on and north of South Dakota Highway 46, beginning at the South Dakota-Iowa State line, thence west to its junction with South Dakota Highway 37, thence north to its junction with U.S. Highway 16, thence west to the South Dakota-Wyoming State line. The purpose of this filing is to eliminate the gateway of points in Oklahoma.

No. MC 113459 (Sub-No. E113), filed May 14, 1974. Applicant: H. J. JEFFRIES TRUCK LINE, INC., P.O. Box 94850, Oklahoma City, Okla. 73109. Applicant's representative: Robert Fisher (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Machinery, equipment, materials and supplies* used in, or in connection with, the discovery, development, production, refining, manufacture, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products, except in connection with main or trunk pipe lines, and *machinery, equipment, materials and supplies* used in, or in connection with, the construction, operation, repair, servicing, maintenance and dismantling of pipe lines, except in connection with main or trunk pipe lines, between points in Nebraska, on the one hand, and, on the other, Casper, Wyo., and those points in Wyoming on and east of a line beginning at the Colorado-Wyoming State line, and extending along U.S. Highway 287 to its junction with U.S. Highway 34, thence along U.S. Highway 34 to its junction with U.S. Highway 87, thence along U.S. Highway 87 to its junction with Wyoming Highway 59, thence along Wyoming Highway 59 to its junction with U.S. Highway 14, thence along U.S. Highway 14 through Moorcroft, Sundance and Benlah, Wyo., to the Wyoming-South Dakota State line. The purpose of this filing is to eliminate the gateways of points in Nebraska west of U.S. Highway 83.

No. MC 113666 (Sub-No. E8), filed June 4, 1974. Applicant: FREEPORT TRANSPORT, INC., 1200 Butler Road, Freeport, Pa. 16229. Applicant's representative: Daniel R. Smetanick (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Refractories* (except in bulk), from Fords, N.J., to those points in West Virginia on and west of U.S. Highway 220. The purpose of this filing is to eliminate the gateway of Hawstone (Mifflin County), and Johnstown, Pa.

No. MC 113666 (Sub-No. E16), filed June 4, 1974. Applicant: FREEPORT TRANSPORT, INC., 1200 Butler Road, Freeport, Pa. 16229. Applicant's representative: Daniel R. Smetanick (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Refractories*, restricted to refractory products (except in bulk), from Fords, N.J., to points in Alabama, Iowa, and those in Tennessee in and west of Campbell, Union, Knox, Blount, Monroe, and Polk Counties, Tenn. The purpose of this filing is to eliminate the gateway of Tarenton, Pa.

No. MC 113861 (Sub-No. E1), filed June 4, 1974. Applicant: WOOTEN TRANSPORT, INC., 153 Gaston Ave., Memphis, Tenn. 38106. Applicant's representative: James N. Clay, III, 2700 Sterick Bldg., Memphis, Tenn. 38103.

Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (1) *Petroleum and petroleum products*, as described in Appendix XIII to the report in *Descriptions in Motor Carrier Certificates*, 61 M.C.C. 209, in bulk, in tank vehicles, from the site of the pipeline terminal of the Oklahoma-Mississippi River Products Lines, Inc., at or near West Memphis, Ark., to points in that part of Tennessee on and east of a line beginning at the Tennessee-Georgia State line extending along U.S. Highway 27 to junction U.S. Highway 127, thence along U.S. Highway 127 to junction Tennessee Highway 8, thence along Tennessee Highway 8 to junction Tennessee Highway 111, thence along Tennessee Highway 111 to Sparta, thence along Tennessee Highway 42 to the Tennessee-Kentucky State line, and points in Indiana, Illinois and Iowa. (New Madrid, Mo., and points within 10 miles thereof.*) (2) *Petroleum and petroleum products*, as described in Appendix XIII to the report in *Descriptions in Motor Carrier Certificates*, 61 M.C.C. 209 (except petro-acids and chemicals and asphalt and asphalt products), in bulk, in tank vehicles, from the site of the pipeline terminal of the Oklahoma-Mississippi River Products Lines, Inc., at or near West Memphis, Ark., to points in that part of Kentucky on and east of a line beginning at the Tennessee-Kentucky State line extending along Alternate U.S. Highway 41 to Hopkinsville, thence along Kentucky Highway 91 to the Kentucky-Illinois State line (Colonial Pipeline terminals at or near Nashville, Tenn.*); (3) *Gasoline, kerosene, jet fuel, tractor fuel, diesel fuel, fuel oils, petroleum napthas and petroleum asphalt*, in bulk, in tank vehicles, from the site of the pipeline terminal of the Oklahoma-Mississippi River Products Lines, Inc., at or near West Memphis, Ark., to points in Mississippi on and south of U.S. Highway 82 (Memphis, Tenn.*); (4) *Anhydrous ammonia*, from Memphis, Tenn., to points in Indiana, Illinois, Iowa, Kansas, Michigan, Oklahoma and Wisconsin, restricted against the transportation of liquid hydrogen, liquid oxygen and liquid nitrogen when moving to missile storage or launching sites, missile test facilities or manufacturing plants producing liquid hydrogen, liquid oxygen or liquid nitrogen (Barfield, Ark., and points within 10 miles thereof*); and (5) *Nitrogen fertilizer solutions*, in bulk, in tank vehicles, from the site of the storage and shipping facilities of the Agrico Chemical Company, Division of Continental Oil Company, located on President's Island, Memphis, Tenn., to points in Indiana, Illinois, Iowa, Kansas, Michigan, Oklahoma and Wisconsin, restricted against the transportation of liquid hydrogen, liquid oxygen and liquid nitrogen when moving to missile storage or launching sites, missile test facilities or manufacturing plants producing liquid hydrogen, liquid oxygen or liquid nitrogen (Barfield, Ark., and points within 10 miles thereof*). The purpose of this filing is to eliminate the gateways indicated by the asterisks above.

No. MC 114211 (Sub-No. E579), filed June 4, 1974. Applicant: WARREN TRANSPORT, INC., P.O. Box 420, Waterloo, Iowa 50704. Applicant's representative: Kenneth R. Nelson (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: Grading, paving, and finishing equipment, from points in Washington, Oregon, California, Nevada, Idaho, and Arizona, and points in that part of Wyoming on and west of a line beginning at the South Dakota-Wyoming State line extending along U.S. Highway 85 to the Wyoming-Colorado State line, and points in that part of Montana on and west of a line beginning at the United States-Canada International Boundary line extending along Montana Highway 247 to junction Montana Highway 24, thence along Montana Highway 24 to junction Montana Highway 200, thence along Montana Highway 200 to junction Montana Highway 22, thence along Montana Highway 22 to junction U.S. Highway 312, thence along U.S. Highway 312 to junction U.S. Highway 212, thence along U.S. Highway 212 to the Montana-Wyoming State line, and points in that part of Utah on and west of a line beginning at the New Mexico-Utah State line extending along Utah Highway 262 to junction U.S. Highway 163, thence along U.S. Highway 163 to junction Utah Highway 123, thence along Utah Highway 128 to junction Interstate Highway 70, thence along Interstate Highway 70 to the Utah-Colorado State line, and to points in that part of New Mexico on and west of a line beginning at the Texas-New Mexico State line extending along U.S. Highway 85 to junction New Mexico Highway 44, thence along New Mexico Highway 44 to junction New Mexico Highway 504, thence along New Mexico Highway 504 to the New Mexico-Arizona State line, to points in New York. The purpose of this filing is to eliminate the gateway of the facilities of Stinar Corp., at Minneapolis, Minn., and Ida Grove, Iowa.

No. MC 115840 (Sub-No. E38), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such plastic pipe, plastic or iron fittings and connections which are utilized as sand hoppers, conveyors, dust collectors and meter boxes*, from Anniston, Ala., to points in Connecticut, Delaware, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, Wisconsin, and the District of Columbia. The purpose of this filing is to eliminate the gateway of the facilities of Clow Corporation near Lincoln, Ala.

No. MC 115840 (Sub-No. E42), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: Such, sand hoppers, conveyors, dust collectors, and *meter boxes as/are embraced in cement asbestos products* (except conduit and pipe which because of size, shape, weight, or inherent character require the use of special equipment), and fittings, materials, and accessories for the installation or transportation thereof (except in bulk), and plastic pipe and pipe fittings in mixed loads with cement asbestos products, from Anniston, Ala. to points in Louisiana, Florida, Tennessee, and Georgia. The purpose of this filing is to eliminate the gateway of Ragland, Ala.

No. MC 115840 (Sub-No. E49), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such farm implements* as are embraced in iron and steel articles, cranes, sand hoppers, elevators, conveyors, dust collectors and meter boxes, (1) From Anniston, Alabama, to that portion of Oklahoma beginning at the Oklahoma-Texas State Line on and west of Oklahoma State Highway 34; and (2) From Anniston, Alabama, to that portion of Texas beginning at the Texas-Louisiana State Line on and south of U.S. Interstate Highway 20, thence west on and south of U.S. Interstate Highway 20 to its intersection with U.S. Highway 69, thence north on and west of U.S. Highway 69 to the Texas-Oklahoma State Line. The purpose of this filing is to eliminate the gateway of Poplarville, Miss.

No. MC 115840 (Sub-No. E51), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such materials and supplies* (except in bulk) used in the operation, production, processing, or transportation of iron and steel articles, cranes, sand hoppers, elevators, conveyors, dust collectors, and meter boxes, as are embraced in iron and steel articles, and *contractors' equipment, materials, and supplies* (except cement and commodities in bulk); (1) from points in that portion of Arkansas on, east, and west of U.S. Highway 167 (including Little Rock) to the Arkansas-Louisiana State line, to points in North Carolina and South Carolina; (2) from points in that part of Louisiana on and east of the Mississippi River to points in North Carolina and South Carolina; (3) from points in Mississippi to points in North Carolina and South Carolina; and (4) from points in that part of Alabama on, west, and east of U.S. Highway 43 (including

Mobile), to junction Interstate Highway 20, thence along Interstate Highway 20 to junction Interstate Highway 65 (including Birmingham and points within 25 miles thereof), thence along Interstate Highway 65 to the Alabama-Tennessee State line (including Cullman), to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Birmingham Ala.

No. MC 115840 (Sub-No. E56), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such iron and steel articles, sand hoppers, conveyors, dust collectors,* and *meter boxes* as are embraced in materials and supplies (except in bulk) used in the agricultural, water treatment, food processing, wholesale groceries, and institutional supply industries, and are also embraced in pipe, fittings, iron castings, and accessories, from Anniston, Ala., to points in California, Oregon, Washington, Idaho, Nevada, Arizona, Montana, Utah, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Texas, Louisiana, Kansas, Minnesota, Iowa, Mississippi, New Jersey, Rhode Island, Pennsylvania, Massachusetts, Connecticut, New Hampshire, Vermont, Maine, Oklahoma, Missouri, Wisconsin, Illinois, Michigan, Ohio, Arkansas, and points in that portion of Alabama on and south of Interstate Highway 10, and Memphis, Tenn. The purpose of this filing is to eliminate the gateways of Birmingham and Holt, Ala.

No. MC 115840 (Sub-No. E61), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Iron and steel articles* (except commodities which because of size or weight require the use of special equipment); (1) from those points in Tennessee located on the Tennessee River north of Knoxville, Tenn., southward to Chattanooga, Tenn., to points in California, Oregon, Washington, Arizona, New Mexico, Colorado, Utah, Nevada, Wyoming, Idaho, Louisiana, Montana, and points in that portion of Texas beginning at the Texas-Louisiana State line on and south of Interstate Highway 20 bounded on the north by Interstate Highway 20, thence along Interstate Highway 20 to junction U.S. Highway 75 (including Dallas), thence north on and west of U.S. Highway 75 bounded on the east by U.S. Highway 75 to the Texas-Oklahoma State line and points in that portion of Mississippi beginning at the Mississippi-Alabama State line on and south of U.S. Highway 82 bounded on the north by U.S. Highway 82 (including Greenwood and Greenville, Miss.), thence west on U.S. Highway 82 to the Mississippi-Arkansas State line; (2) from points in that portion of Tennessee located on the Tennessee River beginning at Chattanooga, Tenn. (including Chattanooga), southward on the Tennessee River to (and including) Decatur, Ala., to points in California, Washington, Oregon, Arizona, New Mexico, Texas, Idaho, Wyoming, Louisiana, Nevada, Utah, Colorado, Montana, and points in that portion of Mississippi beginning at the Mississippi-Alabama State line on and south of Interstate Highway 20 bounded on the north by Interstate Highway 20, thence west on Interstate Highway 20 (including Jackson and Vicksburg, Miss.).

(3) From points in that portion of Alabama on the Tennessee River between Decatur and Florence, Ala., to points in California, Oregon, Washington, Arizona, New Mexico, Texas, Louisiana, Colorado, Nevada, Utah, Wyoming, Idaho, Montana, Massachusetts, Connecticut, Vermont, New Hampshire, Maine, and Rhode Island; (4) between points on that portion of the Tennessee River between Florence, Ala., and the Kentucky-Tennessee State line located on Kentucky Lake to points in California, Oregon, Washington, Arizona, New Mexico, Nevada, Utah, Idaho, Montana, Massachusetts, Connecticut, Vermont, New Hampshire, Maine, and points in that portion of Colorado beginning at the Colorado-New Mexico State line on and west of Interstate Highway 25 bounded on the east by Interstate Highway 25, thence north on Interstate Highway 25 (including Denver and Colorado Springs, Colo.), to the Colorado-Wyoming State line; and (5) from points on that portion of the Mississippi River beginning at Memphis, Tenn. (and including Memphis, Tenn.) to Greenville, Miss., to points in California beginning at the Mexico-California State line (including San Diego, Calif.), on and west of Interstate Highway 5, thence north on Interstate Highway 5 bounded on the east by Interstate Highway 5 (including Sacramento, Calif.) to the California-Oregon State line and that portion of Oregon beginning at the Oregon-California State line on and west of Interstate Highway 5 and bounded on the east by Interstate Highway 5 (including Eugene, Albany, Salem, and Portland, Oreg.), thence north on Interstate Highway 5 to the Oregon-Washington State line, and points in that portion of Washington beginning at the Washington-Oregon State line on and west of U.S. Highway 97 bounded on the east by U.S. Highway 97, thence north on U.S. Highway 97 to the United States-Canada International Boundary line, and Florida; (6) from points on that portion of the Mississippi River beginning at Memphis, Tenn., to Greenville, Miss., to points in Washington, Oregon, Montana, and points in that portion of California beginning at the United States-Mexico International Boundary line (including San Diego, Calif.), on and west of Interstate Highway 5, thence north on Interstate Highway 5 bounded on the east by Interstate Highway 5 (including Sacramento, Calif.), to the California-Oregon State line.

(7) From points on that portion of the Mississippi River beginning at Greenville, Miss., southward to Vicksburg, Miss., to points in Oregon, Washington, Idaho, Montana, and points in that portion of California beginning at the United States-Mexico International Boundary line (including San Diego, Calif.), on and west of Interstate Highway 5 bounded on the east by Interstate Highway 5 (including Sacramento, Calif.), to the California-Idaho State line, and points in Maine, Massachusetts, Vermont, New Hampshire, Connecticut, and Rhode Island; (8) from points on that portion of the Mississippi River beginning at Vicksburg, Miss., southward to Natchez, Miss., to points in Oregon, Washington, Massachusetts, Connecticut, Rhode Island, Maine, New York, New Jersey, Vermont, New Hampshire, and Pennsylvania; (9) from points on that portion of the Mississippi River beginning at Natchez, Miss., southward to Baton Rouge, La., to points in California beginning at the California-Nevada State line on and north of Interstate Highway 80 bounded on the south by Interstate Highway 80, thence along Interstate Highway 80 to the Pacific Ocean, and points in Oregon, Washington, Idaho, Montana, Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, New Jersey; and (10) from points on that portion of the Mississippi River beginning at Baton Rouge, La., to the Gulf of Mexico to points in California, Oregon, Washington, Nevada, Idaho, Wyoming, Montana, New York, New Jersey, Maine, Pennsylvania, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut. The purpose of this filing is to eliminate the gateway of Anniston and Holt, Ala.

No. MC 115840 (Sub-No. E65), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such plastic pipe, plastic or iron fittings, and connections, which are utilized as iron and steel articles, sand hoppers, conveyors, dust collectors and meter boxes*, from Anniston, Ala., to points in Arkansas, Florida, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Oklahoma, Tennessee, Texas, Virginia, West Virginia and Georgia. The purpose of this filing is to eliminate the gateway of the facilities of Clow Corporation near Lincoln, Ala.

No. MC 115840 (Sub-No. E68), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such materials and supplies* (except commodities in bulk) used in the operations of a foundry as are also used in the operation, production, processing, or transportation of iron and steel articles, cranes, sand hoppers, elevators, conveyors, dust collectors, and meter boxes as embraced in iron and steel articles and contractors equipment, materials, and supplies (except cement): (1) from points in California, Oregon, Washington, Idaho, Nevada, Arizona, Montana, Utah, Wyoming, Colorado, New Mexico, Nebraska, Texas, Louisiana, Arkansas, Oklahoma, Mississippi, Kansas, and points in that portion of Alabama on and south of U.S. Highway 82 to points in North Carolina and South Carolina; and (2) from Jefferson, Walker, and Shelby Counties, Ala., to points in North Carolina and South Carolina. The purpose of this filing is to eliminate the gateway of Birmingham and Holt, Ala.

No. MC 115840 (Sub-No. E69), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: Iron and steel fittings, components, parts and accessories for valves, and hydrants, from Anniston, Ala., to points in Arizona, California, Colorado, Idaho, points in Illinois on and bounded by a line beginning at the Illinois-Indiana State line and extending along U.S. Highway 36 to Springfield, Ill., thence along Illinois Highway 29 to Peoria, Ill., thence along Illinois Highway 116 to Metamora, Ill., thence along Illinois Highway 89 to junction U.S. Highway 34, thence along U.S. Highway 34 to junction Illinois Highway 31, thence along Illinois Highway 31 to unnumbered highway (referred to as Aurora Avenue), thence along unnumbered highway to junction U.S. Highway 34 to Chicago, Ill., thence along Lake Michigan to the Illinois-Indiana State line, and thence along the Illinois-Indiana State line to the point of beginning, points in Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Dakota, Ohio (except those points in that part of Ohio on, west, and north of a line beginning at a point on the Ohio-Pennsylvania State line near Sharon, Pa., and extending along U.S. Highway 62 to Columbus, Ohio, thence along U.S. Highway 23 to Circleville, Ohio, and thence along U.S. Highway 22 to Cincinnati, Ohio), and points in Oregon, South Dakota, Texas, Utah, Washington, West Virginia, Wisconsin, and Wyoming. The purpose of this filing is to eliminate the gateway of Anniston, Ala.

No. MC 115840 (Sub-No. E71), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such iron and steel mill products* (which because of their size or weight require the use of special equipment) and *related machinery parts and contractors' materials and supplies* (when their transportation is incidental to that of the size and weight commodities), which are materials and supplies (except in bulk) used in the operation of a foundry and in the operation, production, processing or transportation of iron and steel articles, cranes, sand hoppers, elevators, conveyors, dust collectors and meter boxes, from points in Florida on and south of Interstate Highway 4 from the Atlantic Ocean to the Gulf of Mexico to Birmingham and Bessemer, Ala. The purpose of this filing is to eliminate the gateways of Birmingham and Holt, Ala.

No. MC 115840 (Sub-No. E78), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such iron and steel articles, sand hoppers, conveyors, dust collectors*, and *meter boxes* as are embraced in pipe, fittings, gaskets, iron castings, and accessories (except in bulk), from Anniston, Ala., to points in Ohio, Illinois, New Jersey, Pennsylvania, New York, Maine, Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, Michigan, Texas, Missouri, Arkansas, Wisconsin, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa, Montana, Wyoming, Colorado, New Mexico, Oklahoma, Utah, Nevada, Arizona, California, Washington, Oregon, Idaho, Louisiana, Mississippi, Florida on and south of Florida Highway 60 from the Atlantic Ocean to the Gulf of Mexico, and points in Alabama on and south of U.S. Highway 84, and Tennessee on and west of U.S. Highway 45 and U.S. Highway 45-East. The purpose of this filing is to eliminate the gateway of Holt, Ala.

No. MC 115840 (Sub-No. E79), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such pipe, fittings, gaskets, iron castings*, and *accessories* (except in bulk), as are embraced in iron and steel articles, sand hoppers, conveyors, dust collectors, and meter boxes, from Holt, Ala., to points in Georgia on and north of U.S. Highway 78 and Interstate Highway 20 and points in Florida on and east of Interstate Highway 75 (including Tampa, St. Petersburg, and Clearwater, Fla.), points in Tennessee on and east of Interstate Highway 65 (including Davidson County, Tenn.), and points in that portion of Alabama from the Alabama-Tennessee State line on and east of U.S. Highway 431 to junction Interstate Highway 20, thence along Interstate Highway 20 to the Alabama-Florida State line. The purpose of this filing is to eliminate the gateway of Anniston, Ala.

No. MC 115840 (Sub-No. E105), filed December 30, 1974. Applicant: COLONIAL FAST FREIGHT, INC., P.O. Box 10327, Birmingham, Ala. 35202. Applicant's representative: Roger M. Shaner (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Such cast iron valves* and *components*, and *cast iron hydrants* as are embraced in iron and steel articles from Anniston, Ala., to points in that portion of Florida beginning at the Florida-Georgia State line on and west of U.S. Highway 441, thence south on and west of U.S. Highway 441 to its intersection with Florida Highway 100, thence along Florida Highway 100 to its intersection with Florida Highway 16, thence along Florida Highway 16 to (and including) St. Augustine, Fla., and the Atlantic Ocean. The purpose of this filing is to eliminate the gateway of Birmingham, Ala.

No. MC 118831 (Sub E16), filed May 31, 1974. Applicant: CENTRAL TRANSPORT, INC., P.O. Box 5044, High Point, N.C. 27262. Applicant's representative: Richard E. Shaw (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Dry chemicals* (except fertilizer), in bulk, in tank or hopper-type vehicles, from the plant site of Howerton-Gowen Company, Incorporated at Chesapeake, Va., to points in Alabama and Mississippi. The purpose of this filing is to eliminate the gateway of points in Georgia within the Lanett, Ala., commercial zone.

No. MC 118821 (Sub-No. E17), Filed June 3, 1974. Applicant: CENTRAL TRANSPORT, INC., P.O. Box 5044, High Point, N.C. 27262. Applicant's representative: Richard E. Shaw (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: Liquid chemicals (except fertilizer and vegetable oils), in bulk, in tank vehicles, from Charlotte, N.C., to points in Mississippi. The purpose of this filing is to eliminate the gateway of Lanett, Ala.

No. MC 118831 (Sub-No. E20), filed May 29, 1974. Applicant: CENTRAL TRANSPORT, INC., P.O. Box 5044, High Point, N.C. 27262. Applicant's representative: Richard E. Shaw (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Dry chemicals*, in bulk, in tank or hopper-type vehicles, from the plant site of Howerton-Gowen Company, Incorporated at Chesapeake, Va., to points in Georgia, South Carolina, and that part of Virginia on and west of a line beginning at the North Carolina-Virginia State line and extending along U.S. Highway 301 to junction U.S. Highway 58, thence along U.S. Highway 58 to junction Virginia Highway 46, thence along Virginia Highway 46 to junction U.S. Highway 460, thence along U.S. Highway 460 to junction U.S. Highway 15, thence along U.S. Highway 15 to junction Virginia Highway 20, thence along Virginia Highway 20 to junction U.S. Highway 29, thence along U.S. Highway 29 to junction U.S. Highway 522, thence along U.S. Highway 522 to junction U.S. Highway 11, thence along U.S. Highway 11 to the West Virginia-Virginia State line. The purpose of this filing is to eliminate the gateway of North Carolina.

No. MC 118831 (Sub-No. E27), filed June 5, 1974. Applicant: CENTRAL TRANSPORT, INC., P.O. Box 5044, High Point, N.C. 27262. Applicant's representative: Richard E. Shaw (same as above). Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: Liquid chemicals, in bulk (except petrochemicals), from Richmond County, Ga. to points in Georgia. The purpose of this filing is to eliminate the gateway of South Carolina.

By the Commission.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16567 Filed 6-24-75;8:45 am]

[Notice 22]

MOTOR CARRIER ALTERNATE ROUTE DEVIATION NOTICES

JUNE 20, 1975.

The following letter-notices of proposals (except as otherwise specifically noted, each applicant states that there will be no significant effect on the quality of the human environment resulting from approval of its application), to operate over deviation routes for operating convenience only have been filed with the Interstate Commerce Commission under the Commission's Revised Deviation Rules-Motor Carriers of Property, 1969 (49 CFR 1042.4(c)(11)) and notice thereof to all interested persons is hereby given as provided in such rules (49 CFR 1042.4(c)(11)).

Protests against the use of any proposed deviation route herein described may be filed with the Interstate Commerce Commission in the manner and form provided in such rules (49 CFR 1042.4(c)(12)) at any time, but will not operate to stay commencement of the proposed operations unless filed within 30 days from the date of publication.

Successively filed letter-notices of the same carrier under the Commission's Revised Deviation Rules—Motor Carriers of Property, 1969, will be numbered consecutively for convenience in identification and protests, if any, should refer to such letter-notices by number.

MOTOR CARRIERS OF PROPERTY

No. MC 111383 (Deviation No. 18), BRASWELL MOTOR FREIGHT LINES, INC., P.O. Box 4447, Dallas, Tex. 75208, filed June 11, 1975. Carrier proposes to operate as a *common carrier*, by motor vehicle, of *general commodities*, with certain exceptions, over a deviation route as follows: From Monroe, La., over U.S. Highway 165 to junction Interstate Highway 10 near Lake Charles, La., and return over the same route for operating convenience only. The notice indicates that the carrier is presently authorized to transport the same commodities, over a pertinent service route as follows: From Monroe, La., over U.S. Highway 80 to Vicksburg, La., thence over U.S. Highway 61 to Baton Rouge, La., thence over Interstate Highway 10 to Lake Charles, La., and return over the same route.

No. MC 98327 (Deviation No. 2), SYSTEM 99, 8201 Edgewater Drive, Oakland, Calif. 94621, filed June 16, 1975. Carrier proposes to operate as a *common carrier*, by motor vehicle, of *general commodities*, with certain exceptions, over a deviation route as follows: From Weed, Calif., over Interstate Highway 5 to junction Oregon Highway 58 near Goshen, Oreg., and return over the same route for operating convenience only. The notice indicates that the carrier is presently authorized to transport the same commodities, over a pertinent service route as follows: From Weed, Calif., over U.S. Highway 97 to junction Oregon Highway 58, thence over Oregon Highway 58 to junction Interstate Highway 5 and return over the same route.

No. MC 98327 (Deviation No. 3), SYSTEM 99, 8201 Edgewater Drive, Oakland, Calif. 94621, filed June 16, 1975. Carrier proposes to operate as a *common carrier*, by motor vehicle, of *general commodities*, with certain exceptions, over a deviation route as follows: From Trinidad, Calif., over U.S. Highway 101 to junction U.S. Highway 199 near Crescent City, Calif., thence over U.S. Highway 199 to Grants Pass, Oreg., thence over Interstate Highway 5 to Ashland, Oreg., thence over Oregon Highway 66 to junction U.S. Highway 97, near Klamath Falls, Oreg., and return over the same route for operating convenience only. The notice indicates that the carrier is presently authorized to transport the same commodities, over a pertinent service route as follows: From Trinidad, Calif., over U.S. Highway 101 to junction California Highway 299, thence over California Highway 299 to Redding, Calif., thence over Interstate Highway 5 to Weed, Calif., thence over U.S. Highway 97 to Klamath Falls, Oreg., and return over the same route.

By the Commission.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16568 Filed 6-24-75;8:45 am]

[Notice No. 49]

MOTOR CARRIER APPLICATIONS AND CERTAIN OTHER PROCEEDINGS

JUNE 20, 1975.

The following publications include motor carrier, water carrier, broker, freight forwarder and rail proceedings indexed as follows: (1) Grants of authority requiring republication prior to certification; (2) notices of filing of petitions for modification of existing authorities; (3) new operating right's applications directly related to and processing on a consolidated record with finance applications filed under sections 5(2) and 212(b); (4) notices of filing of sections 5(2) and 210a (b) finance applications; and (5) notices of filing of section 212(b) transfer applications.

Each applicant (except as otherwise specifically noted) states that there will be no significant effect on the quality of the human environment resulting from approval of its application in compliance with the requirements of 49 CFR 1100.250.

Protests to the granting of the requested authority must be filed with the Commission within 30 days after the date of this FEDERAL REGISTER notice (unless otherwise specified). Failure seasonably to file a protest will be construed as a waiver of opposition and participation in the proceeding. A protest should comply with section 247(d) or section 240(c) as appropriate of the Commission's general rules of practice which requires that it set forth specifically the grounds upon which it is made, contain a detailed statement of protestant's interest in the proceeding (including a copy of the specific portions of its authority which protestant believes to be in conflict with that sought in the application, and a detailed description of the method—whether by joinder, interline, or other means—by which protestant would use such authority to provide all or part of the service proposed), and shall specify with particularity the facts, matters, and things relied upon, but shall not include issues or allegations phrased generally. Protests not in reasonable compliance with the requirements of the rules may be rejected. The original and one (1) copy of the protest (except for petitions and Finance Dockets under Rule 40 requiring the original and six (6) copies of the protest) shall be filed with the Commission, and a copy shall be served concurrently upon applicant's or petitioner's representative, or applicant or petitioner if no representative is named. If the protest includes a request for oral hearing, such requests shall meet the requirements of section 247(d)(4) or section 240(c)(4) of the special rules, and shall include the certification required therein.

No. MC 135924 (Sub-No. 2) (Republication), filed March 4, 1974, and published in the FEDERAL REGISTER issue of April 11, 1974, and republished this issue. Applicant: SIMONS TRUCKING CO., INC., Route 3, Box 379, Grand Rapids, Minn. 55744. Applicant's representative: Val M. Higgins, 1000 First National Bank Building, Minneapolis, Minn. 55402. An Order of the Commission, Review Board Number 1, dated June 4, 1975, and served June 13, 1975, finds that the present and future public convenience and necessity require operation by applicant, in interstate or foreign commerce, as a common carrier by motor vehicle, over irregular routes, of (1) *composition board*, from Grand Rapids, Minn., to points in Alabama, Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, Vermont, Washington, and West Virginia, and (2) *phenolic resin* (except in bulk), from Bound Brook, N.J., North Tonawanda, N.Y., Kent, Ohio, and Sheboygan, Wis., to Grand Rapids, Minn.; that applicant is fit, willing, and able properly to perform such service and to conform to the requirements of the Interstate Commerce Act and the Commission's rules and regulations thereunder. The purpose of this republication is to indicate that Arkansas should be included as a destination in (1) above. Because it is possible that other parties who have relied upon the notice of the petition as published, may have an interest in and would be prejudiced by the lack of proper notice of the authority described above, issuance of a certificate in this proceeding will be withheld for a period of 30 days from the date of this publication of the authority actually granted, during which period any proper party in interest may file an appropriate petition for intervention or other relief in this proceeding, setting forth in detail the precise manner in which it has been so prejudiced.

No. MC 111670 (Notice of Filing of Petition to Modify Territorial Description), filed May 7, 1975. Petitioner: ABLE TRUCKING CO., INC., 615 Industrial Rd., Carlstadt, N.J. 07072. Petitioner's representative: George A. Olsen, 69 Tonnele Avenue, Jersey City, N.J. 07306. Petitioner holds a motor *common carrier* certificate in No. MC 111670, issued December 22, 1954, authorizing transportation, as pertinent, over irregular routes, of *General commodities*, except those of unusual value, Classes A and B explosives, household goods as defined by the Commission, commodities in bulk, commodities requiring special equipment and those injurious or contaminating to other lading, Between New York, N.Y., on the one hand, and, on the other, points in Essex, Hudson, Union, Bergen and Passaic Counties, N.J. By the instant petition, petitioner seeks to modify the territorial description in the above authority so as to read: Between points in the New York, N.Y., Commercial Zone, as defined by *Commercial Zones and Terminal Areas*, 53 M.C.C. 451, within which local operations may be conducted pursuant to the partial exemption of section 203(b)(8) of the Interstate Commerce Act (the "exempt" zone), and points in New Jersey any part of which is within 5 miles of New York, N.Y., on the one hand, and, on the other, points in Essex, Hudson, Union, Bergen and Passaic Counties, N.J.; or, in the alternative, that the Commission issue an appropriate order that the petitioner be empowered and permitted to designate as its terminal area, all points within which local operations may be conducted in the New York, N.Y. Commercial Zone as established by the Commission. Any interested person or persons desiring to participate may file an original and six copies of his written representations, views or arguments in support of or against the petition on or before July 25, 1975.

No. MC 121060 (Sub-No. 22) (Notice of Filing of Petition To Modify Commodity Description), filed June 9, 1975. Petitioner: ARROW TRUCK LINES, INC., 1220 West 3rd St., P.O. Box 1416, Birmingham, Ala. 35207. Petitioner's representative: William P. Jackson, Jr., 919 Eighteenth Street NW., Washington, D.C. 20006. Petitioner holds a motor *common carrier* certificate in No. MC 121060 (Sub-No. 22), issued July 17, 1974, authorizing transportation, over irregular routes of *Roofing* and *roofing materials, gypsum and gypsum products, composition boards, insulation materials, urethane and urethane products* and *related materials, supplies, and accessories*, incidental thereto (except commodities in bulk), from the plantsite and warehouse facilities of The Celotex Corporation located at Marrero, La., to points in Alabama, Mississippi, Georgia, Florida, North Carolina, South Carolina, Tennessee, Illinois, Kentucky, Indiana, Ohio, West Virginia, Virginia, Maryland, Delaware, and the District of Columbia. By the instant petition, petioner seeks to modify the commodity description in the above authority so as to read, *Construction materials* (except commodities in bulk). Any interested person or persons desiring to participate may file an original and six copies of his written representations, views or arguments in support of or against the petition on or before July 25, 1975.

No. MC 134599 (Sub-Nos. 36 and 58) (Notice of Filing of Petition To Modify Permits), filed April 24, 1975. Petitioner: INTERSTATE CONTRACT CARRIER CORPORATION, P.O. Box 748, Salt Lake City, Utah 84110. Petitioner's representative: Richard A. Peterson, 521 South 14th Street, P.O. Box 81849, Lincoln, Nebr. 68501. Petitioner holds motor *contract carrier* permits in No. MC 134599 (Sub-Nos. 36 and 58), issued February 6, 1973 and July 8, 1974, authorizing transportation, over irregular routes, in Sub-No. 36, of *Sponge rubber carpet cushion*, from Thomson, Ga., to points in Arizona, California, Oregon and Washington, under a continuing contract, or contracts, with Uniroyal, Inc., of Middlebury, Conn.; and in Sub-No. 58, of (1) *Tires*, from Opelika, Ala., to points in Washington, Oregon, California, Nevada, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, and Louisiana; (2) *Sponge rubber carpet cushion*, from Thomson, Ga., to points in Nevada, Idaho, Utah, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, and Louisiana; and (3) *Tread rubber*, from Conyers, Ga., to points in Washington, Oregon, California, Nevada, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas and Louisiana, under a continuing contract, or contracts, with Uniroyal, Inc., of Middlebury, Conn. By the instant petition, petitioner seeks to delete the commodity descriptions in the above authorities, and substitute in lieu thereof: in Sub-No. 36, *Footwear;* in Sub-No. 58, Part (1), *Tires, tubes, flaps, and valves;* in Sub-No. 58, Part (2), *Footwear;* and in Sub-No. 58, Part (3), *Tread rubber, adhesive cement, tire paint, rubber compound, tire curing bags, plastic film, and petroleum naptha.* Any interested person or persons desiring to participate may file an original and six copies of his written representations, views or arguments in support of or against the petition on or before July 25, 1975.

No. MC 138054 (Sub-No. 2) (Notice of Filing of Petition To Modify Permit), filed June 6, 1975. Petitioner: CONDOR CONTRACT CARRIERS, INC., P.O. Box 1354, Garden Grove, Calif. 92642. Applicant's representative: Harold S. Baker (same address as petitioner). Petitioner holds a motor *contract carrier* permit in No. MC 138054 (Sub-No. 2), issued April 23, 1975, authorizing transportation, over irregular routes, of (1) *Garbage disposal units*, (2) *waste compactor units*, and (3) *parts and accessories* for such commodities (except commodities in bulk), in tank vehicles, and commodities which by reason of size or weight require the use of special equipment), from Racine, Wis., to points in California, Washington, and Oregon, and to Dallas, Tex., Atlanta, Ga., Orlando, Fla., Detroit, Mich., Richmond, Ind., Boston, Mass., Camden, N.J., Landover, Md., and St. Louis and Kansas City, Mo., under a continuing contract or contracts with Emerson Electric Co., solely for transportation to be performed on behalf of its In-Sink-Erator Division of Racine, Wis. By the instant petition, petitioner seeks to add *hot water dispensers* to the above commodity description, and to add Dayton, Ohio and Indianapolis, Ind. as destination points in the above territorial description. Any interested person or persons desiring to participate may file an original and six copies of his written representations, views or arguments in support of or against the petition on or before July 25, 1975.

APPLICATIONS UNDER SECTIONS 5 AND 210a(b)

The following applications are governed by the Interstate Commerce Commission's Special Rules governing notice of filing of applications by motor carriers of property or passengers under Sections 5(a) and 210a(b) of the Interstate Commerce Act and certain other proceedings with respect thereto. (49 C.F.R. 1,240).

MOTOR CARRIERS OF PROPERTY

APPLICATIONS FOR CERTIFICATES OR PERMITS WHICH ARE TO BE PROCESSED CONCURRENTLY WITH APPLICATIONS UNDER SECTION 5 GOVERNED BY SPECIAL RULE 240 TO THE EXTENT APPLICABLE.

No. MC 29079 (Sub-No. 83), filed May 6, 1975. Applicant: BRADA MILLER

FREIGHT SYSTEM, INC., 1210 South Union Street, Kokomo, Ind. 46901. Applicant's representative: Edward K. Wheeler, 704 Southern Building, Washington, D.C. 20005. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: (1) *General commodities* (except those of unusual value, classes A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment), (a) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, points in Illinois and St. Louis, Mo.; (b) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, Kokomo, Ind., and points within 50 miles thereof; (c) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, Toledo, Ohio; (d) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, Louisville, Ky.; (e) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, Holland, Grand Rapids, and Lansing, Mich., and those points in Michigan located in a territory described as follows: beginning at Holland, Mich., and extending along Michigan Highway 21 to Grand Rapids, thence along U.S. Highway 16 (also known as U.S. Highway 96) to Lansing, thence along U.S. Highway 27 to the Michigan-Indiana State Boundary line, including points on said line; (f) between points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., on the one hand, and, on the other, Gary-Portage, Ind; (g) between the plant site and warehouses of North American Rockwell Corporation near Winchester, Ky., on the one hand, and, on the other, points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va.

(h) Between the Ford Motor Company Plant Site near Louisville, Ky., on the one hand, and, on the other, points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate the gateway at at points in Belmont County, Ohio. (i) *general commodities* (except those of unusual value, classes A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment) between the Plant Site of Hussmann Roper Refrigerator Company at Bridgeton, Mo., on the one hand, and, on the other, points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate the gateway at points in Belmont County, W. Va. (2) *iron, steel and iron and steel products, dies, and die parts, die checking fixtures, die models, hand jigs, tools, patterns and templates* when moving in connection with dies, (a) from points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. to points in Indiana (except Kokomo) and points within 50 miles thereof; (b) from points in Brooke, Hancock, Marshall, and Ohio Counties, W. Va., to points in Michigan on and south of a line beginning at Ludington, Mich. and extending along U.S. Highway 10 to intersection unnumbered highway (formerly portion of U.S. Highway 10), at or near Clare, Mich., thence along unnumbered highway to intersection U.S. Highway 10 near Averill, Mich., thence along Business Route U.S. Highway 10 to Midland, Mich., thence along U.S. Highway 10 to the Saginaw River, thence along the Saginaw River to Saginaw Bay; and (c) from Detroit, Mich. and Kelsey Hayes Company, Romulus, Mich. and Gibraltar, Mich., (except no dies, die parts, etc. authority from the origin of Gibraltar, Mich.) to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio.

(3) *Composition building slabs*, loose or individually packaged, from North Judson, Ind., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (4) *prefabricated buildings*, complete, knocked down, or in sections, from Terre Haute, Ind., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (5) *iron and steel articles*, from the plant sites and warehouses of the Kankakee Electric Steel Company, Swanson Manufacturing Company, and Jones & McKnoght, Inc., at Kankakee, Ill., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (6) *aluminum articles*, from the plant site of Harvey Aluminum Company near Lewisport, Ky., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate the gateway at points in Belmont County, Ohio. (7) *general commodities* (except those of unusual value, classes A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment) from points in Brooke, Hancock, Marshall and Ohio Counties, W. Va., to the plant site of Harvey Aluminum Company near Lewisport, Ky. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio.

(8) *Copper cable*, from the Anaconda Wire & Cable Company plant site near LaGrange, Ky., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (9) *general commodities* (except those of unusual value, classes A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment), from points in Brooke, Hancock, Marshall and Ohio Counties, W. Va., to the Anaconda Wire & Cable Company plant site near LaGrange, Ky. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (10) *structural steel tubing*, from Sebewaing, Mich., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (11) *iron and steel articles*, from the plant site of Jones & Laughlin Steel Company in Putnam County, Ill., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (12) *materials, equipment and supplies*, from points in Brooke, Hancock, Marshall and Ohio Counties, W. Va., on the one hand, and, on the other, the plant site of Jones & Laughlin Steel Company in Putnam County, Ill. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio.

(13) *Copper and brass products*, from Eminence, Ky., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (14) *telephone directories and telephone directory pages*, from the plant site of R. R. Donnelley & Sons near Dwight, Ill., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio. (15) *iron and steel articles*, from the plant site of Bethlehem Steel Corporation at Lackawanna, N.Y., to points in Brooke, Hancock, Marshall and Ohio Counties, W. Va. The purpose of this filing is to eliminate gateways at points in Belmont County, Ohio and Columbiana, Ohio. (16) *aluminum and steel articles*, between the facilities of Roll Coater Company, at or near Kingsbury, Ind., on the one hand, and, on the other, points in Brooke, Hancock, Marshall Counties, W. Va. The purpose of this filing is to eliminate a gateway at points in Belmont County, Ohio.

NOTE.—This application is directly related to a section 5 proceeding in MC-F12518 published in the FEDERAL REGISTER issue of May 21, 1975. If a hearing is deemed necessary, applicant requests it be held at either Washington, D.C. or Kokomo, Ind.

No. MC 31533 (Sub-No. 13) (Correction), filed December 10, 1974, published in the FEDERAL REGISTER issue of January 3, 1975, and republished as corrected this issue. Applicant: SOUTH BEND FREIGHT LINE, INC., 1200 South Olive Street, P.O. Box 545, South Bend, Ind. 46624. Applicant's representative: Philip A. Lee, 120 West Madison Street, Suite 618, Chicago, Ill. 60602. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *General commodities* (except commodities in bulk, household goods as defined by the Commission, Classes A and B explosives, articles of unusual value, and commodities which because of size or weight require special equipment), between Morris, Crystal Lake, McHenry, Lakemoor, Romeoville, Frankfort and Yorkville, Ill., and points in Lake, DuPage, Cook and Kane Counties, Ill., in nonradial movements.

NOTE.—The purpose of this republication is to clarify the requested territorial description. This is a matter directly related to a

Section 5(2) proceeding in MC-F-12388 noticed in the Federal Register issue of December 26, 1974. Applicant requests that the hearing be held at Chicago, Ill.

No. MC 33641 (Sub-No. 119), filed April 8, 1975. Applicant: IML FREIGHT, INC., 2175 South 3270 West, P.O. Box 2277, Salt Lake City, Utah 84110. Applicant's representative: Carl Steiner, 39 South La Salle Street, Chicago, Ill. 60603. Authority sought to operate as a *common carrier*, by motor vehicle, over regular and irregular routes, transporting: (A) Regular routes: *General commodities* (except those of unusual value, class A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment), Between Boise and Plummer, Idaho, serving all intermediate points: (1) From Boise over Idaho Highway 55 to junction U.S. Highway 95 near New Meadows, Idaho, thence over U.S. Highway 95 to Plummer, and return over the same route; (2) From Boise over U.S. Highway 30 (Interstate Highway 80N) to junction U.S. Highway 95 near Fruitland, Idaho, thence over U.S. Highway 95 to Plummer, and return over the same route; and (3) From Boise over Idaho Highway 55 to junction U.S. Highway 95 near New Meadows, Idaho, thence over U.S. Highway 95 to junction U.S. Highway 12, thence over U.S. Highway 12 to junction Idaho Highway 3 near Arrow, Idaho, thence over Idaho Highway 3 to junction Alternate U.S. Highway 95, thence over Alternate U.S. Highway 95 to junction Idaho Highway 5 near Saint Maries, Idaho, thence over Idaho Highway 5 to Plummer, and return over the same route; (B) irregular routes: (1) *General commodities* (except those of unusual value, classes A and B explosives, household goods as defined by the Commission, commodities in bulk and those requiring special equipment).

(1) Between points in Idaho south of the southern boundary of Idaho County, Idaho; (2) between points in Idaho south of the southern boundary of Idaho County, Idaho, on the one hand, and, on the other, Jackson Hole, Wyo., West Yellowstone, Mont., McDermitt, Nev., and points in Idaho; and (3) *commodities* which by reason of size or weight, require the use of special equipment, between points in Idaho. Note: (1) Applicant states it does not seek duplicating authority. (2) Applicant seeks to tack the general commodities irregular route authority sought herein: (a) with its existing regular route authority in MC 33641 (Sub-Nos. 24, 35 and 47) at Twin Falls, Pocatello and Boise, Idaho to provide an irregular-route service to points in Idaho in connection with its presently authorized regular-route service; (b) with the regular-route authority requested in (A) above at Plummer, Idaho to provide an irregular-route service between points in Idaho; and (c) with the irregular route authority of Delbert H. Stevens and Ferdinand A. Klein, doing business as Spokane-St. Maries Auto Freight, in MC 1893 which applicant seeks to acquire in MC-F-12484, at St. Maries, Idaho, to provide service between Spokane, Wash., on the one hand, and, on the other, points in Idaho south of the southern boundary of Idaho County, Idaho. (3) Applicant does not seek gateway elimination. Common control may be involved. This is a matter directly related to a Section 5(2) proceeding in MC-F-12484 published in the Federal Register of April 15, 1975. Applicant's regular-route authority in MC 33641 (Sub-Nos. 24, 35 and 47) are filed in the public docket and may be viewed at the office of the Secretary, Interstate Commerce Commission, Washington, D.C. If a hearing is deemed necessary, applicant requests it be held at Salt Lake City, Utah, Boise, Idaho and Spokane, Wash.

No. MC 108067 (Sub-No. 16), filed May 8, 1975. Applicant: AL ZEFFIRO TRANSFER & STORAGE, INC., P.O. Box 296, Murraysville, Pa. 15668. Applicant's representative: Paul F. Sullivan, 711 Washington Bldg., Washington, D.C. 20005. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Commodities*, the transportation of which because of their size or weight, requires the use of special equipment, and *related machinery, parts and related contractors' machinery and supplies* when their transportation is incidental to the transportation by carrier of commodities which by reason of size or weight require the use of special equipment (except aircrafts, and missiles and parts thereof), between points in Pennsylvania in and west of Potter, Clinton, Union, Snyder, Juniata, Perry, Cumberland, and Adams Counties; points in Ohio in and east of Erie, Huron, Ashland, Marion, Delaware, Franklin, Fairfield, Hocking, Vinton, and Geauga Counties; points in Maryland, in and west of Carroll, Frederick and Montgomery Counties, and points in West Virginia in and north of Pocahontas, Greenbrier, Nicholas, Kanawha, Putnam, and Mason Counties, on the one hand, and, on the other, points in Indiana, Kentucky, Michigan, Pennsylvania, West Virginia, Illinois, New York, and points in Adams, Allen, Ashland, Athens, Auglaize, Brown, Butler, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Delaware, Drake, Fairfield, Fayette, Franklin, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Highland, Hocking, Holmes, Huron, Jackson, Knox, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Morrow, Montgomery, Morgan, Muskingum, Noble, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Scioto, Seneca, Shelby, Tuscarawas, Union, Vinton, Warren, Washington, Wayne and Wyandot Counties, Ohio. The purpose of this filing is to eliminate gateways at points in Wayne, Guernsey, and Athens Counties, Ohio.

Note.—This application is a gateway elimination request and is directly related to a Section 5(2) proceeding in MC-F-12519 published in the Federal Register issue of May 21, 1975. Common control may be involved. The territorial description contained herein has been modified by applicant upon request by the Commission in order to conform to the standards set forth in *Glennon Transports, Inc., Extension-New York, N.Y.*, 78 M.C.C. 157 (1958). If a hearing is deemed necessary, applicant requests it be held at Philadelphia, Pa.

No. MC 124111 (Sub-No. 51), filed May 13, 1975. Applicant: OHIO EASTERN EXPRESS, INC., P.O. Box 2297, 300 West Perkins Avenue, Sandusky, Ohio 44870. Applicant's representative: John P. McMahon, 100 East Broad Street, Columbus, Ohio 43215. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *Bananas*, from New York, N.Y. and Port Newark, N.J., to Louisville, Ky.; St. Louis, Mo. and points in Pennsylvania, New Jersey, Ohio, Indiana, Illinois, Michigan, Wisconsin and West Virginia. The purpose of this filing is to eliminate the gateways at Philadelphia, Pa. and Baltimore, Md.

Note.—This application is a gateway elimination request and is directly related to a section 5(2) proceeding in No. MC-F-12526 published in the Federal Register issue of May 30, 1975. If a hearing is deemed necessary, applicant requests it be held at either Washington, D.C. or Philadelphia, Pa.

No. MC 128155 (Sub-No. 3), filed April 17, 1975. Applicant: R.C. VAN LINES, INC., 1044 Northside Drive NW., Atlanta, Ga. 30318. Applicant's representative: Robert J. Gallagher, 1776 Broadway, New York, N.Y. 10019. Authority sought to operate as a *common carrier*, by motor vehicle, over regular routes, transporting: *Household goods* as defined by Commission, (1) between points in Alabama, Florida, Georgia, North Carolina, South Carolina and Tennessee on the one hand, and, on the other, points in Kansas, North Dakota, South Dakota, West Virginia, Wyoming, Iowa, Colorado, Nebraska, and Minnesota. The purpose of this filing is to eliminate a gateway at points in that part of Illinois on and north of U.S. Highway 36, points in that part of Indiana on and north of a line beginning at the Illinois-Indiana State Boundary line and extending along U.S. Highway 36 to Indianapolis, Ind., thence along U.S. Highway 40 to the Indiana-Ohio State Boundary line, points in that part of Michigan on and south of a line beginning at Muskegon, Mich. and extending eastwardly along Interstate Highway 96 to Grand Rapids, Mich., thence along Interstate Highway 96 to Detroit, Mich.; and points in Wisconsin on and south of U.S. Highway 16; Litchfield, Nebr. and points within 25 miles thereof, Cozad, Nebr. and points within 25 miles thereof, and points in Iowa.

(2) Between points in Delaware, Connecticut, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, Wisconsin, and the District of Columbia on the one hand, and, on the other, points in that part of Illinois on and north of U.S. Highway 36, points in that part of Indiana on and north of a line beginning at the Illinois-Indiana State Boundary line and extending along U.S. Highway 36 to Indianapolis, Ind., thence along U.S. Highway 40 to the Indiana-Ohio State Boundary line, points in that part of Michigan on and south of

a line beginning at Muskegon, Mich. and extending eastwardly along Interstate Highway 96 to Grand Rapids, Mich., thence along Interstate Highway 96 to Detroit, Mich.; points in Wisconsin on and south of U.S. Highway 16, Iowa, Nebraska, South Dakota, Wyoming, Colorado, Kansas, Missouri, and Harper, Alfalfa, Garfield, Major, Woods, and Woodward Counties, Okla. The purpose of this filing is to eliminate a gateway at Cozad, Nebr. and points within 25 miles thereof, and points in Iowa, and North Carolina.

NOTE.—This application is a gateway elimination request and is directly related to a section 5(2) proceeding in No. MC-F-12303 published in the FEDERAL REGISTER issue of February 3, 1975.

HEARING: July 28, 1975 for one week in Room 2330, 2nd Floor Federal Building, 1961 Stout Street, Denver, Colo. at 9:30 A.M. Local Time.

No. MC 120879 (Sub-No. 3), filed April 18, 1975. Applicant: GENERAL MOVERS, INC., P.O. Box 392, East St. Louis, Ill. 62202. Applicant's representative: A. Charles Tell, 100 East Broad Street, Columbus, Ohio 43215. Authority sought to operate as a *common carrier*, by motor vehicle, over irregular routes, transporting: *General commodities* (except those of unusual value, Classes A and B explosives, livestock, household goods as defined by the Commission, commodities in bulk, and those requiring special equipment): (1) between points in Illinois on the one hand, and, on the other, St. Louis, Mo. The purpose of this filing is to eliminate a gateway at East St. Louis, Ill. (2) between points in Illinois on the one hand, and, on the other, points in Kentucky on Kentucky Highway 286, not including Wickliffe, Ky. The purpose of this filing is to eliminate a gateway at points in Illinois located within one mile of Paducah, Ky. (3) between points in Illinois on the one hand, and, on the other, Paducah, Ky., Memphis, Tenn., and those points in that part of Tennessee located on U.S. Highway 51. The purpose of this filing is to eliminate gateways at St. Louis, Mo., and points in Ballard County, Ky. (4) between points in Illinois on the one hand, and, on the other, La Center, Ky., and point, in that part of Kentucky within 35 miles of La Center (except those on or within one mile of U.S. Highways 45, 51, or 60). The purpose of this filing is to eliminate gateways at points in Illinois within 25 miles of East St. Louis, Ill., or points in Illinois within 5 miles of Cairo, Ill. (5) between points in Illinois on the one hand, and, on the other, points in Ballard County, Ky. The purpose of this filing is to eliminate a gateway at St. Louis, Mo.

NOTE.—This application is a gateway elimination request and is directly related to a transfer proceeding in MC-FC-75721. If a hearing is deemed necessary, applicant requests it be held at St. Louis, Mo.

No. MC-F-12507 (Correction), (CRETE CARRIER CORP.—Purchase—HILL TRUCKING COMPANY), published in the May 7, 1975, issue of the FEDERAL REGISTER on page 19899. Prior notice should be modified to read: "*peppers* and pimientos, in cans or barrels, from the plant site of Moody Dunbar, Inc., near Limestone, Tenn., to points in that part of the United States on and east . . ." Vendee is authorized to operate as a *contract carrier* in lieu of *common carrier;* and where it states from Fort Wayne, Ind., *to* St. Louis, Mo., should read *and* St. Louis, Mo.

No. MC-F-12513. (Correction), (LEONARD BROTHERS TRANSPORT COMPANY, INC.—Purchase—AMERICAN FREIGHT LINE, INC.), published in the May 14, 1975, issue of the FEDERAL REGISTER on page 20999. Prior notice should be modified to read: under the general commodities, with exceptions, over regular routes, between Ludlow, Mo., and Kansas City, Kans., serving various intermediate and off-route points, restricted to livestock only, between Kingston, Mo., and Kansas City, Kans., serving various intermediate and off-route points, restricted to livestock only, between Polo, Mo., and Kansas City, Kans., serving various intermediate and off-route points, restricted to livestock only; *brick* and *machinery*, over irregular routes, from Parsons and Weir, Kans., to Schell City, Mo.; *threshing machines*, from Des Moines, Iowa, to Schell City, Mo.

No. MC-F-12521. (Correction), (RYDER TRUCK LINES, INC.—Purchase (portion)—TRANSAMERICAN FREIGHT LINES, INC.), published in the May 29, 1975, issue of the FEDERAL REGISTER on page 23402. Prior notice should be modified to read: General commodities, with certain specified exceptions, over regular routes in Arkansas, Kansas, Missouri, Oklahoma and Texas, generally between St. Louis, and Kansas City, Mo.; and between Kansas City, Mo., Oklahoma City, Okla., and Dallas, Tex., serving various intermediate and off-route points; and over two alternate routes for operating convenience only; and numerous specified commodities over irregular routes from, to and between specified points in the States of Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Virginia, West Virginia, and the District of Columbia, as more specifically described in Docket No. MC-10761 and Sub-numbers thereunder. This notice does not purport to be a complete description of all of the operating rights of the carrier involved. The foregoing summary is believed to be sufficient for purposes of public notice regarding the nature and extent of this carrier's operating rights, without stating, in full, the entirety thereof. Vendee is authorized to operate as a common carrier in all of the States in the United States (except Alaska and Hawaii). Application has been filed for temporary authority under section 210a (b).

No. MC-F-12551. Authority sought for purchase by HENNES ERECTING COMPANY, INC., 328 S. 17th St., Milwaukee, WI 53233, of a portion of the operating rights and property of JOHN HENNES TRUCKING COMPANY, also of Milwaukee, WI 53233, and for acquisition by MEDARD SCHMITZ, 17853 W. Nassau Dr., Brookfield, WI 53005, of control of such rights through the purchase. Applicants' attorney: John L. Bruemmer, 121 W. Doty St., Madison, WI 53703. Operating rights sought to be transferred: *Heavy machinery, contractors' equipment*, and *building equipment*, as a *common carrier* over irregular routes, (1) between points in Wisconsin lying north of the following counties: Vernon, Sauk, Columbia, Dodge, Washington and Sheboygan, and (2) between points in the area described in (1) above, on the one hand, and points in Illinois, on the other hand. Vendee holds no authority from this Commission. However, it is affiliated with (1) Hennes Trucking Co., P.O. Box 513, Wilwaukee, WI 53233, and (2) Lang Cartage Corp., 338 South 17th St., Milwaukee, WI 53233, which are authorized to operate as *contract carriers*. (1) in Ohio, West Virginia, Indiana, Kentucky, Illinois, Wisconsin, Pennsylvania, Arkansas, Kansas, Michigan, Missouri, Oklahoma, Tennessee, Nebraska, North Dakota and South Dakota, and (2) in Wisconsin, Minnesota, Illinois, and Iowa. Application has not been filed for temporary authority under section 210a (b).

No. MC-F-12552. Authority sought for purchase by D & L TRANSPORT, INC., 3800 S. Laramie Ave., Cicero, IL 60650, of the operating rights of SUBURBAN EXPRESS, INC., 140 S. 8th Ave., Maywood, IL 60153, and for acquisition by D.L.T. ENTERPRISES, INC., also of Cicero, IL 60650, of control of such rights through the purchase. Applicants' attorney: Arnold L. Burke, 127 N. Dearborn St., Chicago, IL 60602. Operating rights sought to be transferred: Under a certificate of registration, in Docket No. MC-121446 (Sub-No. 1), covering the transportation of general commodities, as a common carrier, in interstate commerce, within the State of Illinois. Vendee is authorized to operate as a *common carrier* in all of the States in the United States (except Alaska and Hawaii). Application has been filed for temporary authority under section 210a(b).

No. MC-F-12553. Authority sought for merger by BROWN TRANSPORT CORP., 125 Milton Ave., S.E., Atlanta, GA 30315, of the operating rights and property of HARPER MOTOR LINES, INC., P.O. Box 460, Elberton, GA 30635, and for acquisition by CLAUDE P. BROWN also of Atlanta, GA 30315, of control of such rights and property through the purchase. Applicants' attorney and representative: Harry C. Ames, Jr., 666 Eleventh St., N.W., Washington, D.C. 20001, and B. K. McClain, P.O. Box 6985, Atlanta, GA 30315. Operating rights sought to be merged: *General commodities*, with certain specified exceptions and numerous other specified commodities, as a *common carrier*, over irregular and regular routes, from, to, and between specified points in the States of Georgia, Maryland, South Carolina, Illinois, Ohio, Missouri, Delaware, Indiana, Kentucky, Michigan, New Jersey, New York, Pennsylvania, Tennessee, Virginia, West Virginia, Iowa, Wisconsin, North Carolina, Alabama, Connecticut, Rhode Island, Florida, Massachusetts, Maine, Mississippi, Vermont, New Hampshire, and the District of Columbia, with certain restrictions, serving various intermediate and off-route points over two alternate routes for operating convenience only, as more specifically described in Docket No. MC-504 and Sub-numbers thereunder. This notice does not purport to be a complete description of all of the operating rights of the carrier involved. The foregoing summary is believed to be sufficient for purposes of public notice regarding the nature and extent of this carrier's operating rights, without stating, in full, the entirety, thereof. BROWN TRANSPORT CORP., is authorized to operate as a *common carrier* in Georgia, North Carolina, Tennessee, Colorado, Montana, Kentucky, Washington, Oregon, Idaho, Utah, Alabama, Florida, Texas, Louisiana, Delaware, Illinois, Indiana, Mississippi, Missouri, North Carolina, Ohio, South Carolina, Virginia, West Virginia, Wisconsin, Michigan, Arizona, California, Iowa, Nebraska, Nevada, New Mexico, Oklahoma, Arkansas, Maryland, Minnesota, Kansas, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, and the District of Columbia. Application has not been filed for temporary authority under section 210a(b).

NOTE.—Pursuant to Dando dated October 23, 1974, and served November 4, 1974 in Docket No. MC-F-11613, transferee acquired control of transferor.

No. MC-F-12554. Authority sought for purchase by RUAN TRANSPORT CORPORATION, Keosauqua Way at Third, Des Moines, IA 50309, of a portion of the operating rights of SCHWERMAN TRUCKING CO., 611 S. 28th St., Milwaukee, WI 53215, and for acquisition by JOHN RUAN, also of Des Moines, IA 50309, of control of such rights through the purchase. Applicants' attorneys: Henry L. Fabritz, P.O. Box 855, Des Moines, IA 50304, and James R. Ziperski, 611 S. 28th St., Milwaukee, WI 53215. Operating rights sought to be transferred: *Lime*, as a *common carrier* over irregular routes, from Sequiota, Mo., to points in Arkansas, Iowa, Kansas, Nebraska, and Oklahoma. Vendee is authorized to operate as a *common carrier* in all of the States in the United States (except Alaska and Hawaii). Application has not been filed for temporary authority under section 210a(b).

No. MC-F-12555. Authority sought for purchase by ROADWAY EXPRESS, INC., 1077 George Blvd., P.O. Box 471, Akron, OH 44309, of the operating rights of KNOXVILLE-MARYVILLE MOTOR EXPRESS, INC., P.O. Box 4006—2335 Texas Ave., N.E., Knoxville, TN 37921, and for acquisition by GALEN J. ROUSH, also of Akron, OH 44309, of control of such rights through the purchase. Applicants' attorneys: William O. Turney, 2001 Massachusetts Ave., N.W., Washington, DC 20036, and Blaine Buchanan, 1024 James Bldg., Chattanooga, TN 37402. Operating rights sought to be transferred: Under certificates of registration in Docket Nos. MC-97904 (Sub-No. 1), MC-97904 (Sub-No. 2), MC-97904 (Sub-No. 4), MC-97904 (Sub-No. 5), MC-97904 (Sub-No. 6), MC-97904 (Sub-No. 7), MC-97904 (Sub-No. 8), MC-97904 (Sub-No. 10), and MC-97904 (Sub-No. 14), covering the transportation of general commodities, and property, as common carriers, in interstate commerce, within the State of Tennessee. Vendee is authorized to operate as a *common carrier* in Alabama, Arkansas, Connecticut, Georgia, Delaware, District of Columbia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, South Carolina, Texas, Virginia, West Virginia and Wisconsin. Application has been filed for temporary authority under section 210a(b).

No. MC-F-12556. Authority sought for purchase by OVERLAND EXPRESS, INC., P.O. Box 2667, New Brighton, MN 55112, of a portion of the operating rights of BAY AND BAY TRANSFER CO., INC., 334 N. First St., Minneapolis, MN 55401, and for acquisition by WILLIAM F. HAGERMAN, P.O. Box 2667, New Brighton, MN 55112, of control of such rights through the purchase. Applicants' attorney: Charles W. Singer, 2440 E. Commercial Blvd., Fort Lauderdale, FL 33308. Operating rights sought to be transferred: *General commodities*, excepting among others, classes A and B explosives, household goods, and commodities in bulk, as a *common carrier* over irregular routes, between points in Minneapolis and St. Paul, Minn. Vendee is authorized to operate as a *common carrier* in Connecticut, Delaware, District of Columbia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin. Application has not been filed for temporary authority under section 210a(b).

No. MC 107993 (Sub-No. 29) (supplemental), this proceeding is entitled *Willis Trucking Company—Extension* and directly related to No. MC-F-11913, *J. J. Willis Trucking Company—Purchase—Chesley Transportation Co., Inc.* Corrected notice in No. MC 107993 (Sub-No. 29) was previously published on November 21, 1973. This supplemental notice clearly reflects certain authority requested to be granted, according to the report and order of Division 3, acting as an Appellate Division, served June 12, 1975. The commodity authority (and involved territorial authority) are as follows: *Commodities*, the transportation of which requires the use of special equipment by reason of their size or weight, and *related machinery, parts, and contractors' equipment and supplies* when their transportation is incidental to the transportation of commodities which by reason of size or weight require the use of special equipment, and *self-propelled articles* each, weighing 15,000 pounds or more, restricted to commodities which are transported on trailers. Serving all points as a regular route carrier along the following named highways, and all other points in California as off-route points, said authority including the right to serve Blythe and Winterhaven, Calif., and their respective commercial zones, including the Arizona portions thereof. (1) U.S. 101 and U.S. 101 by-pass between Oregon-California State line and California-Mexico line; (2) U.S. 99, 99-E and 99-W between Oregon-California State line and the Mexico border; (3) U.S. 299 between Redding and Alturas, California; (4) U.S. 395 between the Oregon-California State line and California-Nevada State line, via Alturas and Johnstonville;

(5) State Highway 36 between junction 99-E near Red Bluff, California, and junction U.S. 395 at Johnstonville; (6) State Highway 20 between Marysville, California and junction U.S. 40; (7) U.S. 40 between San Francisco and California-Nevada line; (8) U.S. 50 between Sacramento, California, and California-Nevada State line; (9) U.S. 395 between California-Nevada State line at Topaz Lake and junction U.S. 66; (10) U.S. 65 between Los Angeles and Needles, California; (11) U.S. 60 between Los Angeles, California and California-Arizona State line; (12) U.S. 91 and 466 between Barstow and Nevada-California State line; (13) U.S. 80 between San Diego and California-Arizona State line; (14) State Highway 127 between Baker and Nevada-California State line. The aforesaid report has already granted authority, in this proceeding, to serve the above-noted territory, insofar as the following commodities are concerned: Machinery, equipment, materials, and supplies used in, or in connection with, the discovery, development, production, refining, manufacture, processing, storage, transmission, and distribution of natural gas and petroleum and their products and by-products,

Machinery, equipment, materials, and supplies used in, or in connection with, the construction, operation, repair, servicing, maintenance and dismantling of pipelines, including the stringing and picking up thereof. Materials, and equipment used in, or in connection with the construction of roads, dams, bridges, power plants, and compressor plants. Notice of filing of an Application Finance Docket No. 27921 by Thomas F. Patton and Ralph S. Tyler, Jr., Trustees of the property of Erie Lackawanna Railway Company, Debtor, under Section 5(2) of the Interstate Commerce Act, as amended, for an order or orders approving and authorizing the extension of trackage rights over the line of The Baltimore and Ohio Railroad Company between Carrollton, New York and Mt. Jewett, Pa., at J&B Jct. Notice is hereby given that on May 21, 1975, the above Application was filed with the Interstate Commerce Commission. With respect to this notice, the following information is supplied: 1. Name and address of applicants: Thomas F. Patton and Ralph S. Tyler, Jr., Trustees of the Property of Erie Lackawanna Railway Company, Debtor, Midland Building, 101 Prospect Avenue NW., Cleveland, Ohio 44115. Name and address of counsel for applicants: Richard Jackson, Vice President—Law, Erie Lackawanna Railway Company, Midland Building, 101 Prospect Avenue NW., Cleveland, Ohio 44115.

2. The proposed transaction covers the extension of trackage rights over the line of The Baltimore and Ohio Railroad Company between Carrollton, New York and Mt. Jewett, Pennsylvania at J&B Jct., a distance of approximately 4.96 miles of lines of railroad. The Baltimore and Ohio Railroad Company (B&O) is a carrier subject to Part I of the Interstate Commerce Act. 3. The transaction is a contract pursuant to which applicant would obtain trackage rights over the line of B&O between Limestone, New York and Carrollton, New York, a distance of approximately 4.96 miles. This involves an extension of a trackage right presently existing between B&O and Erie Railroad Company, predecessor of the EL, which involved trackage located between Limestone, New York and J&B Jct., Pa., a distance of about 28.8 miles, under the terms of an agreement between B&O and the Erie dated June 20, 1957.

In the opinion of the applicant, the relief sought is not a major federal action significantly affecting the quality of the human environment. In accordance with the Commission's regulations (49 CFR 1100.250) in Ex Parte No. 55 (Sub-No. 4), Implementation-National Environmental Policy Act, 1969, 340 I.C.C. 431 (1972), any protests may include a statement indicating the presence or absence of any effect of the requested Commission action on the quality of the human environment. If any such effect is alleged to be present, the statement shall include information relating to the relevant factors set forth in Ex Parte No. 55 (Sub-No. 4), supra, Part (b) (1)–(5), 340 I.C.C. 431, 461. The proceedings will be handled without public hearings unless protests are received which contain information indicating a need for such hearings. Any protest submitted shall be filed with the Interstate Commerce Commission on or before July 25, 1975.

By the Commission.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16569 Filed 6-24-75;8:45 am]

[Notice 14]

MOTOR CARRIER BOARD TRANSFER PROCEEDINGS

JUNE 25, 1975.

Synopses of orders entered by the Motor Carrier Board of the Commission pursuant to sections 212(b), 206(a), 211, 312(b), and 410(g) of the Interstate Commerce Act, and rules and regulations prescribed thereunder (49 CFR Part 1132), appear below:

Each application (except as otherwise specifically noted) filed after March 27, 1972, contains a statement by applicants that there will be no significant effect on the quality of the human environment resulting from approval of the application. As provided in the Commission's special rules of practice any interested person may file a petition seeking reconsideration of the following numbered proceedings on or before July 15, 1975. Pursuant to section 17(8) of the Interstate Commerce Act, the filing of such a petition will postpone the effective date of the order in that proceeding pending its disposition. The matters relied upon by petitioners must be specified in their petitions with particularity.

No. MC-FC-75722. By order of June 11, 1975, the Motor Carrier Board approved the transfer to Mullins, Inc., Fort Pierce, Fla., of the Certificate of Registration in No. MC 121680 issued May 8, 1972, to Freshwater-Smith Machine Company, a corporation, Fort Pierce, Fla., evidencing a right of the holder to engage in interstate motor carrier operations corresponding in scope to the grant of authority in certificate No. 702 issued by the Florida Public Service Commission. Marc A. Cianca, P.O. Box 2552, Stuart, Fla. 33494, Attorney for applicants.

No. MC-FC-75875. By order of June 12, 1975, the Motor Carrier Board approved the transfer to Richard B. Brunzlick, Inc., Augusta, Wis., of Permits Nos. MC 125140, MC 125140 Sub 2, MC 125140 Sub 5, MC 125140 Sub 7, MC 125140 Sub 9, MC 125140 Sub 11, MC 125140 Sub 13, and MC 125140 Sub 18, issued by the Commission November 6, 1963, February 5, 1971, February 5, 1971, February 5, 1971, May 28, 1970, April 7, 1971, September 21, 1971, and June 10, 1974, respectively, to Richard B. Brunzlick, Augusta, Wis., authorizing the transportation of dairy products, fruit juices, and similar commodities, from, to, or between points in the States of Wisconsin, Minnesota, Illinois, Iowa, Indiana, and Missouri, among others. Mr. F. H. Kroeger, Authorized Representative, Associated Motor Carriers Tariff Bureau, Inc., 1745 University Avenue, St. Paul, Minn. 55104.

No. MC-FC-75882. By order of June 13, 1975, the Motor Carrier Board approved the transfer to Gordon L. Petersen, doing business as Clovis Moving and Storage, Clovis, N. Mex., of the operating rights in Certificate No. MC 128649 (Sub-No. 1) issued October 15, 1969, to Jack Chambless, doing business as Clovis Moving & Storage, Clovis, N. Mex., authorizing the transportation of used household goods, between Clovis, N. Mex., on the one hand, and, on the other, points in Curry County, N. Mex. Edwin B. Tatum, Four Pile Place, P.O. Box 520, Clovis, N. Mex. 88101, Attorney for applicants.

No. MC-FC-75879. By order of June 16, 1975, the Motor Carrier Board approved the transfer to Hughes Refrigerated Express, Inc., Cornwells Heights, Pa., of Certificates Nos. MC 105782 Sub 3, MC 105782 Sub 4, and MC 105782 Sub 7, issued by the Commission October 23, 1968, October 23, 1968, and March 25, 1974, respectively, to W. W. Hughes, Mary L. Hughes, Administratrix, doing business as Hughes Refrigerated Express, Cornwells Heights, Pa., authorizing the transportation of frozen foods, frozen fruits, berries, vegetables, and similar commodities from, to, or between points in the States of Pennsylvania, Maryland, New Jersey, New York, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, Missouri, North Carolina, Ohio, Virginia, Tennessee, and Wisconsin, among others, and the District of Columbia. Alfred Francis Shea, Esquire, 2043 Bristol Pike, Cornwells Heights, Pa. 19020.

No. MC-FC-75907. By order entered June 12, 1975, the Motor Carrier Board approved the transfer to Dick Simon Trucking, Inc., Salt Lake City, Utah, of the operating rights set forth in Certificate No. MC 135221, issued April 19, 1972, to Western Provisions, Inc., Vernon, Calif., authorizing the transportation of bananas, and agricultural commodities exempt from economic regulation under section 203(b)(6) of the Act, when transported in mixed loads with bananas, from specified areas in Arizona, California, and Nevada, to ports of entry on the United States-Canada Boundary line in Idaho, Montana, and North Dakota, and points in that part of Washington east of U.S. Highway 97. Miss Irene Warr, 430 Judge Building, Salt Lake City, Utah 84111, attorney for applicants.

[SEAL] JOSEPH M. HARRINGTON,
Acting Secretary.

[FR Doc.75-16570 Filed 6-24-75;8:45 am]

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PART II

ENVIRONMENTAL PROTECTION AGENCY

■

PESTICIDE PROGRAM

Guidelines for Registering Pesticides in United States

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 162]

[FRL 375-1; OPP-30004]

PESTICIDE PROGRAMS

Guidelines for Registering Pesticides in the United States

On October 16, 1974, the Environmental Protection Agency (EPA) published in the FEDERAL REGISTER (39 FR 36976) proposed regulations for the registration, re-registration and classification of pesticides under section 3 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended (7 U.S.C. 136 et seq.) In that publication, as well as in the FEDERAL REGISTER issued October 23, 1974 (39 FR 37670), notice was given that preliminary draft Registration Guidelines, §§ 162.40, 162.63–162.82, (hereafter referred to as "Guidelines") had been made available for public review at the Environmental Protection Agency's Headquarters in Washington, D.C. and at the Regional Offices, and that the Agency later would issue these Guidelines as formal proposals for comment.

The Guidelines were initially organized into 8 major parts, but have since been expanded with the addition of Section 162.83, *Packaging, storage and disposal*. Sections 162.40, 162.63–162.82 have been completed and are presented here for public comment. Section 162.41 *Registration procedures*, § 162.52, *Experimental use permits*, § 162.83 *Petitions for tolerances*, and § 162.94 *Packaging, storage and disposal* are not included at this time. Upon their completion, these sections will be issued as formal proposals for comment and will subsequently be added to the Guidelines.

Section 162.40 consists of introductory material describing the scope and the intent of the Guidelines. Section 162.63 offers guidance to the registrant on data required to substantiate proposed claims for product performance. Section 162.71 addresses the factors that must be considered by the applicant in the development of the product label. Section 162.77, *Chemistry*, relates to data necessary for the general evaluation of products and individual ingredients. Section 162.80 describes the data required of the applicant to evaluate product hazard to humans, domestic animals, fish and wildlife. In recognition of the fact that the nature of required data often depends upon specific product parameters, data are described as either unconditionally required, in which case it is required of all pesticides, or conditionally required, in which case the product parameters are specified.

This copy of the Guidelines constitutes the seventh version of the manuscript. Copies of drafts 1 (January 3, 1972) and 2 (May 1, 1972) were circulated, on a limited basis, to segments of the pesticide industry and to interested government agencies. Draft 3 (dated March 21, 1973) was submitted to some 200 reviewers representing other Agency programs, other Federal agencies, pesticide manufacturing groups, user groups, the National Agricultural Chemical Association (NACA), environmentalist groups, State Agricultural Experiment Station personnel, the academic community and scientific associations. Based on their reviews, draft 4 (November 30, 1973) was prepared. Many specific and general comments received on draft 4 were collated and individually assessed by joint *ad hoc* committees comprised of personnel from OPP and the Chairman of the Guidelines Committee of NACA. Draft 5 (October 1974) of the document underwent interagency review and reflects other agencies' comments. Draft 6 reflects further refinements of draft 5.

Significant comments received during the development of the document were limited to four main areas. One, comments were critical of apparent inflexibility of the Guidelines. Comments indicated the Guidelines were too dogmatic and suggested dropping the strong, hardline attitude for a more relaxed attitude offering examples of suggested methods rather than required methods. Two, some comments concerning genetic activity of pesticides could not be adequately included because the state of the art of genotoxic testing and evaluation is not sufficiently well developed. The Science Advisory Board of EPA has been asked to review this subject at the same time EPA is receiving public comment on these guidelines. As further acceptable and substantive information and test protocols (related especially to toxicological effects) become available, however, they will be incorporated into the Guidelines and the Appendices. Three, chemistry data requirements were subjected to considerable criticism. Chemistry data requirements are still stringent, but not as much as in the original document. Four, comments expressed difficulty with the organization of the original document. As a result of the comments, a careful editorial review was made in which the chapters were reorganized and new chapter headings were created.

OVERVIEW

This Agency is required to publish guidelines specifying the kinds of information which will be required to support the registration of a pesticide. Moreover, the Act requires the Administrator to register a pesticide if he determines that, when considered with any imposed restrictions:

(1) Its composition is such as to warrant the proposed claims for it;

(2) Its labeling and other material required to be submitted comply with the requirements of this Act;

(3) It will perform its intended function without unreasonable adverse effects on the environment; and

(4) When used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment.

1. SECTION 162.63. PRODUCT PERFORMANCE

The development of a substance or mixture of substances into a pesticide must include preliminary tests to evaluate its effectiveness and its usefulness. A product must, of course, be effective to be useful, and its usefulness is negated if, for example, it also kills desirable plants, causes harm to non-target species or has other deleterious effects. Effectiveness ascertains the product's ability to control the specified target pest or produce the specified plant action. Usefulness ascertains man's ability to apply the product according to the directions and cautions on the label without causing unreasonable adverse effects. Laboratory, greenhouse and/or small plot field testing are conducted to determine the inherent effectiveness of a substance against specific pest organisms. Once this is established, evidence of the effectiveness and usefulness of the proposed product is augmented through advanced large-scale laboratory and/or field-testing procedures which closely approach actual commercial use and which employ commercial application equipment.

The actual test procedures will vary according to the chemical characteristics, the type of formulation and packaging, the dosage rates or use dilutions, the methods and timing of application, and the target pest. Certain basic techniques are essential, however, as outlined under General Considerations in this section. This section also includes specific problems as discussed under Special Considerations. Because an acceptable test for one product or use may not be valid to support another product intended for the same use or for the same product intended for even a slightly different use, it is impossible to specify mandatory methods in this guide. Suggestions are provided in the Appendices, but the registrant or his testing agent must be responsible for the validity of the particular test or tests employed. The relationship of the product performance test results to label directions for use and limitations is presented in § 162.64, Label development.

2. SECTION 162.71. LABEL DEVELOPMENT

Clear and easily understood labeling is essential to the proper use of any pesticide. The Agency has a continuing interest in the improvement of the quality of pesticide labels. Section 162.10 of the regulations, dealing with the registration and classification of pesticides, treats in detail the labeling requirements of FIFRA, as amended, and attempts to improve the communicative value of labels and labeling by complete coverage of required warnings and precautionary statements, statement of use classification, labeling format, which must be considered in developing acceptable labeling.

Parameters which must be considered in developing acceptable labeling are treated in the Guidelines under subsections entitled General Comments and Specific Comments. The information contained under General Comments pertains to all pesticide products and provides guidance on acceptable claims, directions for use, limitations for use, and precautionary statements. Additional detailed information for specific types of products is provided under the Specific Comment subsection.

3. SECTION 162.77. CHEMISTRY

The physical and chemical nature of a pesticide, its metabolites and degradation products are important determinants of potential hazard. This section is divided into two parts. The first, General Product Chemistry, relates the data necessary for the basic manufacturing process, information required for active and inert ingredients, assay and impurity assessment for technical products, information required for formulations, storage stability data, and residue information for pesticides on tobacco. The second part, Environmental Chemistry, discusses the following studies to measure the environmental impact of pesticides: pesticide fate and movement studies, pesticide residue studies, photodegradation, volatilization, and microbiological studies.

On June 23, 1970, the Agency notified persons responsible for Federal registration of pesticides of studies that were determined to be necessary to determine the impact of pesticides on the environment (PR Notice 70-50). These studies are designed to characterize the potential environmental significance of the various biological, chemical and physical processes that occur with the dissipation of pesticides. These studies are maintained in the Guidelines as the bases for many of the present test requirements. Studies called for, among other things, the rate of dissipation of the pesticide in soil, the mechanism of degradation of the pesticide residues, accumulation studies of the parent compound and principle metabolites in fish, rabbit, bird tissue, leaching studies, and studies to determine pesticide fate and movement in water. To these the Guidelines have added volatilization studies as a new environmental chemistry requirement designed to test pesticides for outdoor uses.

4. SECTION 162.80. HAZARD EVALUATION

Toxicological effects depend upon the chemical properties of the pesticide, the life stage of the exposed organisms, and the environmental conditions at the time of exposure. The toxic effects can be such that they may cause immediate death, reduced activity, paralysis, or other debilitations. Short-term acute effects may occur when a highly reactive compound acts upon a particular state of an animal or plant. In the case of long-term or chronic effects, subtle detrimental effects such as behavioral changes and induction of tumors may appear after a period of time.

Section 162.80 discusses the toxicological information necessary to assess toxicity to man and domestic animals, and fish and wildlife. It sets forth methods for collecting and reporting toxicity data which an applicant for registration or reregistration of a product must provide to the Agency pursuant to 40 CFR 162.8. This toxicity data enables the Agency:

(1) To determine whether registration should be approved and whether the pesticide product should be classified for general use or restricted use according to the criteria of 40 CFR 162.11;

(2) To determine whether the proposed labeling contains adequate precautions and warnings to protect pesticide users, exposed humans, domestic animals, fish and wildlife;

(3) To establish residue tolerances to protect consumers of exposed foods; and

(4) To determine conditions under which farm workers can reenter treated fields.

a. *Hazards to humans and domestic animals.* In the early 1950's toxicological requirements for registration of a pesticide was generally limited to an acute oral study (single dose) and a subacute study (30 to 90 day exposure). There was little concern at that time for the possible effects on people of long-term, low level exposure to pesticides. The situation is very different today. An increased awareness exists of the possible long-term impact of pesticides on man and the environment. Along with this increased public awareness has been the development of powerful analytical methods of detecting trace amounts of pesticide residues and of new test systems for evaluating the teratogenic, oncogenic, and mutagenic potential of chemicals.

Regulations issued under the amended FIFRA specify conditions under which an evaluation of the teratogenic, oncogenic, and mutagenic potential of chemicals. These conditions, which are detailed in the Guidelines, increase the number of pesticides that require such evaluation. However, in most cases information is required on an active ingredient basis and therefore testing does not have to be performed for each individual product for which an application for registration is submitted. In addition to the oncogenic study, a requirement is conditionally specified in the Guidelines for a two-year feeding study on appropriate test animals. The Agency recognizes that the two-year feeding study and the oncogenic study can be combined into a single test if correct protocols are observed. However, two rather than one test are specified to emphasize the Agency's requirement of well designed studies for oncogenic evaluation.

In the past if a pesticide received a negligible tolerance for food or feed use only subacute testing was required. These Guidelines, in conjunction with regulations issued under the amended Act, require the evaluation of oncogenic, chronic feeding and reproduction effects for all pesticides that have food or feed uses, unless specific exemptions from such requirements are given by the Agency. These requirements are prompted by the fact that even low pesticide residue levels in the human diet cannot, in general, be equated to toxicological insignificance.

Often conditionally required tests described in the Guidelines are acute and subacute inhalation tests, subacute dermal and oral tests, neurotoxicity tests, and metabolism and potentiation studies. In addition, required tests for all pesticide registrations include acute oral LD-50, acute dermal LD-50 and primary dermal irritation and primary eye irritation. The requirements for these acute and subacute tests are not changed by the Guidelines.

EPA published worker protection standards for agricultural pesticides on May 10, 1974. Included in these were label requirements specifying a permissible reentry data will be required for cholinesterase inhibiting pesticides. The Guidelines reflect this new data requirement.

b. *Hazards to fish and wildlife.* To reduce the possible adverse effects which might result from fish and wildlife being exposed to quantities of pesticides in the environment, data must be secured for pesticides that will be used outdoors or that may contaminate water or other environmental resources.

Acute and subacute toxicities are the initial criteria by which potential hazard to fish and wildlife is evaluated. To provide a more complete environmental evaluation, the Agency has added to the Guidelines two fundamental acute tests and one chronic residue study. The two acute tests are the avian acute oral LD-50 and the invertebrate acute toxicity. The avian acute oral had been required up until 1971 at which time the avian subacute dietary LC-50 replaced this test. It is now felt that the avian acute oral LD-50 data is important for pesticide registration and has been reincorporated as a basic test along with the avian subacute dietary LD-50, fish acute toxicity, and invertebrate acute toxicity. Invertebrate acute toxicity data are required for sensitive aquatic invertebrates. As a conditional test, subacute or chronic fish and/or invertebrate reproduction studies normally will be required if the pesticide is used in, or likely to contaminate, aquatic environments. In addition, other conditional tests for fish and wildlife include mammalian toxicity data as required for evaluating hazard to humans and domestic animals, acute toxicity data (LC-50, 96-hour protocol) for shrimp, crabs, and oyster larvae, satisfactory evidence that the pesticide will not cause unreasonable adverse effects on the flora and fauna in aquatic environments, reproduction studies on two species of birds, and any other toxicity data beyond those outlined in this section as requested on an individual basis.

LEGAL STATUS

Section 3(c)(2) of the FIFRA provides that the "Administrator shall publish guidelines specifying the kinds of information which will be required to support the registration of a pesticide and shall revise such guidelines from time to time." Furthermore, Agency is required to follow the provisions of the Administrative Procedure Act (APA). The APA (5 U.S.C. et seq.) defines "rule" to mean:

> * * * the whole or part of an agency statement of general or particular applicability of future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure or practice requirements of an agency * * *

The issuance of the Guidelines is an implementation of the amended FIFRA, and, therefore, under this definition, constitutes rulemaking. The APA establishes two types of rulemaking procedures: "informal" and "formal" or adjudicatory rulemaking. Formal rulemaking procedures generally are required when the statute concerned expressly requires that rulemaking be conducted "on the record." FIFRA imposes no such requirements; therefore, informal rulemaking procedures are applicable to the Guidelines.

The Guidelines are to be used in conjunction with Title 40, Code of Federal Regulations, Part 162, Regulations for the Registration, Reregistration and Classification of Pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act. Other parts of 40 CFR that are pertinent to the registration of pesticides include Part 163, Certification of Usefulness of Pesticide Chemicals; Part 165, Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticide Containers; Part 170, Worker Protection Standards for Agricultural Pesticides; and Part 180, Tolerances and Exemptions from Tolerances for Pesticide Chemicals in or on Raw Agricultural Commodities.

PURPOSE

The overall purpose of the Guidelines is to inform interested members of the general public of the factors entering into the pesticide registration process, to encourage and enhance the ability of the applicant for registration to present an adequate and completely documented application, and to assist the Agency in expediting the review procedure. Such guidance will reduce some of the uncertainty associated with achieving compliance with the requirements for registration. The Agency believes that the decisions, allowing for the range of variables involved in pesticide Guidelines as proposed will apply to the vast majority of registration decisions, allowing for the range of variables involved in pesticide registration.

Flexibility is a key element of the Guidelines; as new material is developed to suit changing technology, the existing document will be expanded and modified. Entire parts may be added or deleted as new policies and requirements are established, new test procedures introduced, or Agency procedures changed. The Agency may modify the data requirements in support of a particular application if additional data is required to assess the product. On the other hand, if an applicant questions the applicability of the Guidelines to his own situation, he may propose for approval an alternative approach better suited to his case. The Guidelines therefore are designed to serve the public interest without establishing requirements which are inflexible or inappropriate to particular registration actions.

APPENDICES TO GUIDELINES

The significance and validity of information required by the Guidelines depend on the test procedures employed to develop it. Thus, the Guidelines are accompanied by the Appendices describing test procedures which have been determined to be adequate to provide data satisfying registration in the majority of cases. Such a comprehensive step has not been taken in the past with respect to Federal regulation of pesticides. The Appendices describe those test methods, procedures, or protocols related to developing registration data for: (1) Product efficacy; (2) environmental chemistry; and (3) hazards to humans and domestic animals and fish and wildlife. Because of the diversity of the materials, the information is presented in several formats:

(1) Bibliographic citations only, where material cited is available in open literature and the method or protocol is acceptable precisely as presented.

(2) Annotated bibliographic citations, where a modification, adaptation, or explanatory statement is necessary for acceptable data development for registration.

(3) Full text (with source credit) of unpublished methods or protocols of those that are not readily available.

(4) Full text of procedures compiled from several sources, authorities, or references.

The Appendices are divided into subject headings which correspond to the Guidelines. Some parts covering several types of pesticide products may be further divided alphabetically into subparts. Part IV. A, for example, will cover product performance related to aquatic pest control agents; Part IV. B, product performance related to aquatic pest control agents. Subject headings presently designated "reserved" will, as the Appendices are progressively developed, contain other material that may assist a registrant in compiling data or in completing application packages.

The Appendices contain examples of test procedures that are acceptable to the Agency. However, the Agency recognizes that applicants may be aware of other test procedures which are equally effective for particular purposes and that new procedures will be developed in the future. It also recognizes that the test methods described in the Appendices sometimes may not be well suited to the evaluation of certain products. Therefore, applicants for registration may be permitted to use procedures other than those set out in the Appendices, provided that the new methods do not detract from the intent and reliability of the Guidelines/Appendices. Similarly, applicants may be sometimes required to use other procedures if the protocols in the Appendices are not applicable. In all cases, the burden is on the applicant to exercise his best scientific judgment.

MEANS OF ISSUANCE

The Guidelines and Appendices will be published in the FEDERAL REGISTER in final form with such changes as the Agency deems warranted upon consideration of all comments. In order to facilitate their use, these documents and subsequent amendments will thereafter be published in a loose-leaf format, which will be available on a subscription basis from the Government Printing Office, Washington DC 20402. The loose-leaf format will allow quick and easy insertion and deletion of material.

The Guidelines and Appendices are not intended to be static. As new material is developed, the existing documents will be expanded and modified. Any major changes will be made in accordance with the informal rulemaking procedures of the APA. Changes to the Guidelines and Appendices which are routine or insignificant in nature or impact, and therefore unimportant to the industry and the public will be adopted without prior notice and opportunity to comment, pursuant to the provisions of the APA authorizing such procedures where the Agency finds that notice and comment are either impracticable, unnecessary, or contrary to the public interest.

PUBLIC COMMENT

Interested persons are invited to submit written comments with reference to this notice to the Federal Register Section, Technical Services Division (WH-569), Office of Pesticide Programs, Environmental Protection Agency, Room 401, East Tower, 401 M Street, SW., Washington, D.C. 20460. Three copies of the comments should be submitted to facilitate the work of the Environmental Protection Agency and others interested in inspecting the documents. The comments must be received on or before August 27, 1975, and should bear the identifying notation OPP-30004. All written comments filed pursuant to this notice will be available for public inspection in the Federal Register Section, Office of Pesticide Programs, from 8:30 a.m. to 4 p.m. Monday through Friday. A limited supply of copies are available at EPA Headquarters, Room 509 East Tower.

Dated: June 3, 1975.

RUSSELL E. TRAIN,
Administrator.

Part 162 of 40 CFR is amended by adding §§ 162.40 through 162.96 to read as follows:

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162.40 Scope and intent guidelines.

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AUTHORITY: Sec. 3, Federal Insecticide, Fungicide, and Rodenticide Act, as amended (7 U.S.C. 136 et seq.).

GENERAL

§ 162.40 Scope and intent of guidelines.

(a) The legislative authority for pesticide registration is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Pub. L. 88–305, as amended by the Federal Environmental Pesticide Control Act of 1972, Pub. L. 92–516. The Administrator of the Environmental Protection Agency is authorized by section 3(c)(5) of the amended FIFRA to register a pesticide if he determines that, when considered with any imposed restrictions:

(1) Its composition is such as to warrant the proposed claims for it;

(2) Its labeling and other material required to be submitted comply with the requirements of this Act;

(3) It will perform its intended function without unreasonable adverse effects on the environment; and

(4) When used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment.

If the Administrator determines that all of these requirements are satisfied, the registration application will be approved. To enable this determination, the applicant for registration must provide data in support of the application which is used to define its composition, to establish its efficacy, and to evaluate the hazard it poses.

(b) Section 3(c)(2) of the Act provides that the Administrator shall publish guidelines specifying the kinds of information which will be required to support the registration of a pesticide. This publication meets the requirement of section 3(c)(2). Its purpose is threefold: (1) To inform applicants of the correct procedures for registration and to explain the data requirements for registration set out in the regulations under section 3 of amended FIFRA (40 CFR Part 162); (2) to inform interested members of the general public of the factors used to make registration decisions; and (3) to assist registration officials in providing expeditious reviews by improving the completeness, quality and consistency of applications for registration.

(c) The validity of information submitted to meet data requirements depends on the test procedures employed and the expertise of the individuals performing the tests. Accordingly, these Guidelines include Appendices describing test procedures which have been determined to be adequate to develop data for registration purposes. Data developed in accord with these procedures will be acceptable; however, the Appendices do not prescribe inflexible registration requirements. The Agency recognizes that applicants may be aware of other test procedures which are equally effective for particular purposes, and that new procedures will be developed in the future. It also recognizes that the test methods described in the Appendices sometimes may not be well suited to the evaluation of particular products. Thus, modification of the specific procedures set out in the Appendices is permissible, providing the intent and reliability of the suggested methods are met. In cases where an applicant proposes to deviate from the procedures suggested in the Appendices, prior agreement with the Agency on the specific data development methods to be employed is strongly recommended.

(d) Neither the Guidelines themselves nor the Appendices are static documents. They will be expanded and revised periodically to reflect new scientific knowledge, new trends in pesticide development, and new Agency policies. All applicants, and new applicants in particular, are encouraged to consult with the Office of Pesticide Programs to resolve any questions relating to the Guidelines or data requirements. Any applicant who considers that certain provisions of the Guidelines may not be appropriate for a particular pesticide should submit a written statement of his position, and consult with the Office to determine what data are necessary in his particular case.

(e) Applicants are reminded that other statutes than FIFRA, as amended, affect the regulation of pesticides. A specific product proposed for registration under FIFRA may also be subject to provisions of the Federal Food, Drug, and Cosmetic Act; the Federal Water Pollution Control Act; the Federal Hazardous Substances Act; the Occupational Safety and Health Act; or the Poison Prevention Packaging Act. Specific references to appropriate statutes and their relevance to registration matters are made in other parts of these Guidelines.

(f) In addition to the internal efforts of the Office of Pesticide Programs, this publication reflects the critical reviews of experts from industry, academic communities, scientific associations, environmentalist groups, and other government agencies. The Office of Pesticide Programs is indeed indebted to these reviewers for their time and conscientiousness, but more important, for their specialized interests, acuities, and experience that have contributed heavily to making this a workable document.

REGISTRATION PROCEDURES

§§ 162.41–162.51 [Reserved]

EXPERIMENTAL USE PERMITS

§§ 162.52–162.62 [Reserved]

PRODUCT PERFORMANCE

§ 162.63 Overview.

(a) The development of a substance into a pesticide must include certain preliminary tests to evaluate its effectiveness and its usefulness. Laboratory, greenhouse, and/or small plot field-testing should be conducted to determine the inherent effectiveness of a substance against specific pest organisms. Once this is established, evidence of the effectiveness and usefulness of the proposed product must be further augmented through advanced large-scale laboratory and/or field-testing procedures which closely approach actual commercial use and which employ commercial application equipment. All tests should consider such factors as degree and duration of pest control, crop yield and quality, crop injury, flavor, animal acceptability, environmental injury and any others which confirm the safe, effective use of the product.

(b) The terms effectiveness and usefulness should be distinguished. Effectiveness refers to a product's ability to actually control the specified target pest or produce the specified plant action; usefulness refers to man's ability to apply the product according to the directions and cautions on the label without causing unreasonable adverse effects on himself, his environment, or his food. A product must, of course, be effective to be useful, but its usefulness is negated if, for example, it also kills desirable plants, causes harm to beneficial species, damages surfaces to which it is applied, or has other deleterious side effects.

(c) The actual test procedures will vary according to the characteristics of the chemical, the type of formulation, the target pest, the use patterns, the methods and timing of application, but certain basic techniques are essential, as outlined under General Considerations in this part. Specific problems are discussed under Special Considerations, also in this part. The relationship of test results to label directions for use and limitations is presented in Part V. Label Development. Because an acceptable test for one product or use may not be valid to support another product intended for the same use or for the same product intended for even a slightly different use, it is impossible to specify mandatory methods in this guide. Suggestions are provided in the Appendix below, but the registrant or his testing agent must be responsible for the validity of the particular test or tests employed.

(d) Testimonials or letters of recommendation are unacceptable in support of effectiveness claims. However, statements of opinion from individual cooperators regarding the efficacy and limitations of a particular product are of value when submitted in conjunction with test reports.

§ 162.64 General considerations.

(a) *Product parameters.* (1) *Formulation and packaging.* Several factors associated with formulating and packaging a pesticide influence the effectiveness of the active ingredient. The chemical and physical compatibilities of formulated pesticides, which include mixtures of pesticides and mixtures of pesticides with diluents, emulsifiers, fertilizers, solvents, spreaders, and stickers, must be evaluated. Formulated products proved effective in laboratory tests are sometimes ineffective as presented to the user for a variety of reasons, including short shelf life, chemical reaction with the repackaging component, or failure of the spray device to function properly. Or a product initially effective at the user level may suddenly become ineffective because of a change in the can liner coating, product emulsifier, solvent or other component used. Mixtures of 2 or more pesticides into a single formulation may react chemically, be physically incompatible (producing a useless product), or be mutually antagonistic or synergistic for effectiveness. For these reasons, final tests to support the effectiveness and usefulness of a product must be conducted with the formulation for which the registrant is applying for registration, and sometimes—especially in the case of pesticides marketed in cans—with the same packaging to be used commercially.

(2) *Dosage rates or use dilutions.* Data should indicate the minimum effective dosage and dosage range and demonstrate an adequate safety margin between the maximum label dosage and injury. Dosages should be reported in one or more of the following terms:

(i) Amount per unit of surface area.

(ii) Amount per unit volume of solvent or diluent.

(iii) Amount per unit volume or weight of commodity.

(iv) Amount per unit volume of space.

(v) Amount per unit volume or area; depth (acre-foot or hectare-meter).

(vi) Amount per linear distance of crop row.

(vii) Amount per animal.

(viii) Amount per unit weight of animals.

(ix) The length of time of spraying and the distance from the surface (for certain pressurized products).

(3) *Application techniques.* Each test report must clearly describe all test conditions that may be needed for proper evaluation. Pertinent topics may include the following:

(i) The type of application for each test, such as ultralow volume (ULV), low volume (LV) or conventional full coverage spray. ULV refers to a total volume of ½ gal, or less, of undiluted spray per acre. LV applies when the volume of spray per acre is more than ½ gal but not greater than 3 gal. When a product is diluted before or during application, the report must specify the quantities and type of each diluent. More specific criteria may be developed, directed toward the unique characteristics of certain classes of pesticides, as necessary.

(ii) The equipment used, such as mist blowers, hydraulic ground sprayers, backpack sprayers, dusters, soil injectors or incorporators, and aircraft (fixed wing or helicopter) and aircraft systems.

(iii) The method of application. Descriptions of soil injection applications should include such information as chisel spacing and depth of injection; soil surface applications should indicate depth and method of incorporation, if any; row treatments should indicate in-furrow, band-over-row or sidedressing application. Such terms as scrubbing, wiping, rinsing, soaking, flooding, and mopping can describe some methods of application.

(iv) The timing of applications. Test reports should specify the time at which treatment was begun and the interval, in days, between succeeding applications, in terms of one or more of the following:

(A) Dates.

(B) Number of days before or after planting, emergence, or harvest.

(C) The stage of growth of the crop.

(D) The stage of growth or expected appearance of the pest.

(v) Site of application. Contact pesticides must be applied to the pests themselves, whereas residual type products are applied to surfaces which will in turn be contacted by pests. The specific site of application required for effective use of residual pesticides may be related to feeding or other habits of insects and other animals, or the location of infection or contamination by fungi and bacteria. For example, dogs establish urinary scent posts, and repellents must be applied to these areas to be effective. Or as another example, because mites feed on the lower sides of plant leaves, nonsystemic miticides must be applied to these undersurfaces. The site of application may also be directly related to the mode of action of the pesticide. A systemic insecticide may be applied to foliage and be transported to other parts of the plant where it will control feeding insects. A plant growth regulator may be applied to the foliage and travel to the part of the plant where biological control occurs. A granular herbicide may be applied to the ground, be absorbed by the roots and be transported into the stem or foliage where it exerts its biological action.

(vi) Tank mixes and serial applications. Directions for use which imply or recommend that products be either mixed in the spray tank before application or applied in sequence must have registered directions, limitations and precautions appropriate for such intended uses.

(A) Tank mixtures may include either a pesticide product and an adjuvant or 2 or more pesticide products that are applied simultaneously by mixing them in a spray tank. The purpose of tank mixing is to improve the economy of application and, at the same time, to broaden the spectrum of pest species to be controlled; to improve the level of control; to reduce dosages of individual components; or to increase the duration of control. Directions for tank mixing of products must be supported by adequate performance data on the effectiveness and usefulness of the proposed mixture at the dosage rate(s) specified for each pest indicated. (See also chemistry and hazard evaluation data requirements.) The components of a pesticide mixture must be physically, biologically and chemically compatible, and determination of interaction is an essential part of the evaluation of mixtures. No method is presently available to predict possible interactions without actual testing. A combination of analysis of variance, a method for multiple range tests, and a method of determining synergistic and antagonistic responses can identify significant interactions, relate results from one treatment to another, and provide an order of magnitude of each result.

(B) Serial application is the use of one pesticide immediately or shortly after the use of another, so that the target area (usually soil) will contain both pesticides at the same time. The registrant may find it to his advantage, where tank mixing is impractical, to specifically direct serial applications on product labels. These directions must be supported by performance data on each product to be applied in serial applications.

(b) *Experimental design.* Experimental techniques should be performed with sufficient precision to make the results obtained convincing and adequate for registration purposes. Separate tests are usually necessary to evaluate product performance against each pest under each set of variables, or use conditions. Occasionally 2 or more pests may be present on or in the same target area and their control can be evaluated simultaneously. Pertinent test variables can include some of those discussed below.

(1) *Climatic factors.* The testing schedule should be designed to permit evaluations of the effectiveness of pesticides used under different environmental conditions (arid versus moderate and high precipitation, cool versus warm and hot temperatures, normally cloudy versus normally sunny conditions, and low versus high humidity or dew formation), if these are relevant. Important abnormal conditions may occur within a given area which cannot be considered in the test design but which can markedly affect test results. Any such effects observed should be reported in the conclusions.

(2) *Edaphic (Soil) Factors.* A number of variables relating to the soil may be pertinent in evaluating a pesticide product. Several of these, such as soil temperature, texture, fertility, organic matter content, tillage practices and irrigation and rotation schedules, measurably influence pesticide performance within a geographic area. Accordingly, field-tests should be designed on a factorial or other reasonable basis to include pertinent parameters. Safety to crops planted in the treated area the same season, and in following seasons,

must be demonstrated. Residue data also will be required for soil pesticides used in conjunction with food or feed crops planted just before, during, or after treatment. (See Chemistry.)

(3) *Geographic distribution of tests.* If products are to be marketed on a nationwide basis, they will be subjected to the impact of a number of differences in climate, soil texture, variety, strain and density of the pest, variety of crop, etc. Tests, then, must be conducted in each major geographic area in which a crop and/or pest are of economic importance. If the pest control programs are of local importance, the data should be obtained only from those local or regional areas concerned. If a crop is grown only in a particular territory or region of the world, outside the United States, adequate test reports will be accepted from that territory or region.

(4) *Product application.* If more than one method of application is to be employed, such as air and ground, experiments must be designed to obtain the required data for each method.

(i) Information detailing the type of application as row (in-furrow, band or sidedressing) or broadcast must accompany the test report data. Pesticides applied as row treatments cannot be accurately reported on a quantity-per-acre basis without also reporting the distance between rows and the width of the treated band.

(i) An increase in the amount of the product applied may result in illegal residues, reduced yield or other adverse reactions. A decrease in the amount of the product applied as a result of decreasing the distance between rows may lower the effectiveness of the product.

(5) *Statistical procedures.* Statistical procedures are usually necessary in evaluating product performance, and the experimenter should either be well-informed or have competent advice in experimental design, sampling procedures, and statistical methods of analysis. The test should be designed so that such analyses can be made if required. The direct comparison of group means of treated and untreated checkplots may be sufficient to show the effectiveness of a product. More extensive analysis will be required if the difference between means is small or if 2 or more variable factors or their interactions are being evaluated.

(i) In effectiveness testing, the probability that a particular treatment will provide effective pest control is usually measured as treated versus untreated check. Untreated checks, however, are not always practical, particularly when testing on very large areas against motile pests or in motile substrates: For example, aircraft applications for insect control, certain field-tests with vertebrate pest control agents, or herbicides applied to moving bodies of water. When they are impractical, a product must be tested against some other base, such as another product of known efficacy used as a reference standard, or conditions measured before the start of the test.

(ii) Small plots on vegetable and forage crops, such as 50 ft of row, and singlebranch or single-tree plots on fruits may provide precise results but are rarely sufficient to support valid conclusions about product performance. Plots should be large enough to reflect actual commercial use conditions, yet small enough not to impose an economic hardship on the registrant. Such factors as the crop grown, equipment used, expected incidence of the pest, need for residue samples, yield data, and quality studies often dictate the size of field plots.

(iii) The number of plot replicates should be large enough to furnish a confidence level of 95 percent. Generally, the smaller the size of the individual plots, the larger the number of replicates required.

(iv) Checks and controls should represent all of the variables within the test except the one being investigated. For instance, in testing the effectiveness of a product in controlling a pest on a crop, the test design should include areas of the field manipulated exactly as all other areas of that field except for the application of the test product. Thus, a baseline of no effect on a pest can be established with which to compare the effect of various dosage rates of the product.

(v) To be representative of a population, sampling procedures must ensure that the sample reflects all characteristics of the population. The size of samples required for reliable estimates will vary with the effect to be characterized. For example, entire plots may need to be harvested for accurate yield estimates, whereas representative portions of each plot will probably be sufficient for measuring pest control.

(c) *Effectiveness and usefulness.* The primary parameter to be judged is that of the action of the product in preventing, destroying, repelling or mitigating a pest; accelerating or retarding the rate of growth or otherwise altering the behavior of plants; defoliating plants or artificially accelerating the drying of plant tissue. The experiment is largely designed to evaluate this effectiveness, but it can also be designed to obtain information on usefulness in terms of adverse effects noted. Registration of a pesticide product is dependent upon its lack of unreasonable adverse effects on man or his environment. Most unfavorable effects can be avoided by providing proper directions for use and caution statements, but the possibility of such effects must be recognized. It is impossible to list all of the hazards which may arise, but some examples are noted below and others are given in Hazard Evaluation.

(1) Phytotoxicity may result from treatment. A good test design will provide for dosages higher than necessary for pest control to allow an estimate of the margin of safety between effective pesticide levels and those which injure the crop. Dosages of 2 to 4X the estimated maximum for effectiveness (both in concentration and total amount applied per unit area) are usually sufficient, but dosages greater than 6X may be necessary for mist blower or aircraft application. Phytotoxicity is usually measured in terms of chlorosis, malformed plant parts, leaf burning, plant wilting and death. Some injury can often be tolerated; plants may recover or the extent of injury may not be of economic or aesthetic importance—but it should be noted. Pesticide products and their metabolites whose phytotoxicity or plant residue data indicate the necessity for rotational restrictions beyond 2 normal potential plants (18 mo) are usually considered prohibitively persistent for issuance of a registration for which a tolerance is required.

(2) Yield determinations will require advanced planning in the test design. Pesticide treatment may reduce yield below a tolerable level or so alter the normal ripening process that economic problems arise in harvesting. But pesticide applications also frequently result in increased yield and precise data on such benefits should be submitted.

(3) Quality may be improved or severely impaired by the application of pesticides. Taste panel tests, color determinations, blemish counts, livestock palatability trials, etc., can be incorporated into the experimental design for food or feed crop uses. Test designs also can be developed to evaluate adverse pesticide effects on materials and surfaces. Fabrics, for example, may be discolored, stained, tenderized or the hand may be changed; leather may become brittle; or the bonding capacity of paint to surfaces may be destroyed.

(d) *Reporting data.* (1) Systematic and complete reporting and assembly of data from individual plot tests and field-tests to support label claims for performance of a product or mixture is essential for efficient and effective review.

(2) All details of the tests should be reported, with particular emphasis on those variables incorporated on the label directions, limitations and precautions. Such details include:

(i) Crop (varieties) or site treated

(ii) Location of the tests

(iii) Plot size

(iv) Number of replications

(v) Soil type and organic matter

(vi) Formulation used

(vii) Rate of application

(viii) Finished spray volume per acre

(ix) Time of application in terms of crop stage

(x) Stage of weed pests at time of application

(xi) Method of application

(xii) Pertinent comments regarding unusual test conditions or performance

(xiii) Interval between treatment and observation

(xiv) Interval between observations

(xv) Yields

(xvi) Time of harvest

(xvii) Percent control of specific pests compared to untreated controls and the commercial standard

(xviii) A rating scale (or percent) showing performance related to commercial acceptability and type of efficacy and/or injury noted.

(3) Considerations for assembling the reported efficacy data to expedite review should include:

(i) Index the data reports according to each claim on the label, such as rates, formulations, times and methods of application, specific weed response, crop response. Use numbered tabs to separate individual reports.

(ii) Prepare tabular summaries of the data where each horizontal line is equivalent to a test and the columns are label claims. Organize these summaries according to the test locations (States or geographic areas).

(iii) Summarize and draw conclusions related to label claims. Include analyses and evaluations.

(iv) If any data are included from the testing of formulations other than the one proposed for registration, they should be presented and summarized separately.

(4) A brief description noting if the product is translocated or acts on contact, and other general descriptions, would be helpful as available.

§ 162.65 Specific considerations: Antimicrobial agents.

(a) The term antimicrobials as used in this section includes all preparations intended for preventing, destroying or mitigating any bacteria, pathogenic fungi or viruses in any environment except (1) those on or in living man or other animals; (2) those on or in living plants; and (3) those on or in processed food, beverages, or pharmaceuticals. Antimicrobials include sterilizers, sporicides, disinfectants, virucides, sanitizers, bacteriostats, and fungicides and fungistats used against fungi that are pathogenic for man or other animals. (See also Specific Considerations: Fungicides.)

(b) In the development of antimicrobial pesticides, the manufacturer usually knows (1) the types of claims he wishes to make for his product; (2) where he intends for the product to be used; and (3) the level of activity he expects his product to possess. He is usually concerned about the performance data which will be required by the Agency for registering such a product. Since the extent of testing required by the Agency varies with each of the factors mentioned above, it is difficult to separate performance data requirements from these factors, and to speak of product performance in general terms.

(c) *Definitions of performance levels.* (1) Because of the variety of microorganisms to be controlled and the different claims and many use patterns of products, it is important that terminology and definitions be clearly understood by the registrant. A program for evaluating label claims must be based on uniform definitions and a common understanding of words and terms.

(2) According to Webster's Dictionary (unabridged), a disinfectant is an agent that frees from infection; especially: A chemical that destroys vegetative forms of harmful microorganisms but not ordinarily bacterial spores—used especially of substances suitable for application to inanimate objects.

(3) Disinfection connotes the combating of an infection, and infectious processes generally involve living plants, animals or other biological entities. Therefore, in the administration of FIFRA, as amended, environmental surfaces are deemed to be contaminated, not infected. Disinfectants are considered only in relation to the inanimate environment and refer to products that kill the growing forms, but not necessarily the resistant spore forms, of microorganisms. Where the intended use is specifically against a spore-forming microorganism, the spores also would have to be killed. Similarly, a disinfectant recommended for use specifically against a virus would have to inactivate the virus irreversibly. The term disinfectant implies a degree of specificity in that proper use is contingent on the purpose for which it is employed and on the type of microorganism which must be destroyed. A disinfectant is used where the complete elimination of an infectious or other undesirable microorganism is intended or required. The terms germicide, bactericide, germicidal and bactericidal are synonyms that can be used instead of disinfectant or disinfect, as defined under FIFRA, as amended. A germicide, bactericide, virucide, fungicide or sporicide is a product that is cidal or lethal to specific kinds of microorganisms, referring, respectively, to germs, bacteria, viruses, pathogenic fungi or spores.

(4) A virucide (viricide), according to Webster's Dictionary (unabridged) is a physical or chemical agent that destroys or inactivates viruses. The unqualified use of this term represents the product as cidal (lethal) against all viruses. For registration purposes, virucidal claims must be qualified; that is, specific viruses that have been shown by current laboratory methods to be irreversibly inactivated by the product must be named on the label.

(5) A bacteriostat is an agent that inhibits the growth of bacteria in the presence of moisture and, in so doing, may or may not affect the viability of the bacteria. A fungistat is a chemical agent acting similarly on pathogenic fungi. These microorganisms, when transferred to a different environment, may still be capable of growth and reproduction. Since pathogens in a state of chemical stasis are capable of initiating infections in living animals, bacteriostatic or fungistatic treatments cannot be recommended or used as replacements for disinfecting processes. See specific comments on fungicides and nematicides for a definition of the term fungicide in reference to nonpathogenic fungi.

(6) A sanitizer is an agent that reduces microbial contaminants to safe levels as determined by Public Health Ordinances or that reduces the microbial population by significant numbers where public health requirements have not been established. Sanitizers meeting Public Health Ordinance requirements are generally used on food contact surfaces and are recognized as sanitizing rinses. They are not disinfectant, germicidal or bactericidal rinses. The intent of use as a sanitizer or the specific claim to sanitize would identify a product as a pesticide. The term sanitary appearing on a label is identified as a state of cleanliness and does not carry with it connotations of pesticidal benefits. A detergent-sanitizer is a product that possesses the property of a cleaner and a sanitizer. It is considered as a representation of value against bacteria greater than that provided by an ordinary soap or an ordinary detergent. Likewise, a germicidal-detergent by these basic definitions would have to possess the properties of both a disinfectant and a cleaner.

(7) An antiseptic is an agent that opposes sepsis, putrefaction or decay by preventing or arresting the growth of microorganisms. The word antiseptic is restricted to applications on or in the living body of man or other animals. Products recommended for skin disinfection, hand sanitization, teat dips, udder washes and applications on farrowing sows are treatments on the living body of man or animals and are not subject to regulation under FIFRA, as amended. Such applications fall under the purview of the Federal Food, Drug, and Cosmetic Act. Concurrent jurisdiction is exercised by the Environmental Protection Agency and the Food and Drug Administration over products identified both as pesticides and drugs.

(8) Deodorizers are chemical agents of 2 basic types: (i) Those that prevent the formation of bacterial odors by acting upon microorganisms which produce them, and (ii) those that mask, chemically destroy or neutralize odors. Only those deodorizers that are described as type (i) are subject to regulation under the Act.

(9) To sterilize means to destroy all living microorganisms. A sterilizer is an agent or a device that will destroy or eliminate all forms of life, including all forms of vegetative bacteria, bacterial spores, fungi and viruses. This is an absolute term; qualified terms such as practically sterile and commercially sterile are not considered acceptable.

(d) *Products for Use on Hard Surfaces.*—(1) *Disinfectant.* When a disinfectant is recommended for use in areas where effectiveness against Gram-negative enteric bacteria is of primary importance, and lack of effectiveness against other species may not be a critical factor (for example, toilet bowls and urinals), only minimal claims, such as germicide, disinfectant, or bactericide are permitted on the label. A disclaimer of effectiveness against Gram-positive bacteria may be required.

(i) Minimal disinfectant activity must be substantiated with efficacy data derived from either the Association of Official Analytical Chemist's (AOAC) Use Dilution Method for water-soluble powders and liquid products or the AOAC Germicidal Spray Products Method[1] for spray products. Sixty replicates are required on each of 3 samples, representing 3 different batches, tested against Salmonella choleraesuis. One of these batches, aged to represent a 60-day shelf life stability study, must also be tested with 30 replicates on duplicate samples against S. choleraesuis.

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[1] Complete citations for official test methods suggested in this section are included in a list of references in Appendix Part IV. Tentative test methods, suggested protocols, or test methods that require some modification for registration testing are entered separately in Appendix Part IV and cited individually in this section.

(ii) When a disinfectant is recommended for general use in any area (except medical areas), or if it is represented as having a broad spectrum of activity, more extensive testing is required. In addition to the 60 replicates on each of 3 samples, representing 3 different batches, tested against S. Choleraesuis, 30 replicates on each of these 3 samples must be tested against Staphylococcus aureus and one other pathogen. One of these batches, aged to represent a 60-day shelf life stability study, must also be tested with 30 replicates on duplicate samples against S. choleraesuis. (Employ AOAC Use Dilution or Germicidal Spray Products Method.)

(iii) When a disinfectant is recommended for use in hospitals, clinics, dental offices, etc., 60 replicates are required on each of 3 samples, representing 3 different batches, tested against S. aureus. Thirty replicates on each of these 3 samples must also be tested against S. choleraesuis and Pseudomonas aeruginosa. One of these batches, aged to represent a 60-day shelf life stability study, must be further tested with 30 replicates on duplicate samples against S. aureus. (Employ AOAC Use Dilution or Germicidal Spray Products Method.)

(2) *Phenol Coefficients.* Any phenol coefficient claim requires testing by the AOAC Phenol Coefficient Method from duplicate samples of one batch against Salmonella typhosa. If a phenol coefficient is declared against any other bacterium, the test also must be run against each bacterium named. The AOAC Use Dilution Test must be employed as the confirmatory procedure for determining the disinfecting efficacy of a product and the basis for recommending an effective use dilution.

(3) *Pathogenic Fungi.* Claims against specific pathogenic fungi must be supported with efficacy data derived from duplicate samples of one batch using the AOAC Fungicidal Test.

(4) *Mycobacterium tuberculosis.* Claims against M. tuberculosis must be substantiated with efficacy data derived from the AOAC Tuberculocidal Activity Method on one batch of a liquid product under test. If the product is a spray, the procedure must be modified to conform with the AOAC Germicidal Spray Product Method using the media, microorganisms, etc., described in the AOAC Tuberculocidal Activity Method.

(5) *Other Microorganisms.* Claims for effectiveness against specific microorganisms other than those named in the AOAC Use Dilution Method or the AOAC Germicidal Spray Products Method can be accepted only when supported by efficacy data derived by the appropriate method on 10 replicates of one batch against each microorganism claimed.

(6) *Sporicides.* All sporicidal claims must be substantiated with efficacy data derived from the AOAC Sporicidal Test. The test requires 30 replicates on each of 2 kinds of carriers (porcelain penicylinders and surgical silk suture loops) against spores of both *Bacillus subtilis* and *Clostridium sporogenes* on 3 different batches (120 carriers per batch or total of 360 carriers). Thirty carriers of each type must also be tested against spores of either microorganism on duplicate samples of one of the 3 batches aged to represent a 60-day shelf life stability (total of 120 carriers for the stability test). Added claims for effectiveness against spore forming organisms other than *B. subtilis* and *C. sporogenes* must be substantiated with data derived from 30 replicates (porcelain penicylinders) on one batch.

(7) *Sterilizers.* The AOAC Sporicidal Test is the basis for substantiating sterilizing claims. In addition to the basic data (360 carriers) required for sporicidal claims, 30 carriers of each type must be tested against spores of *B. subtilis* and *C. sporogenes* on duplicate samples of one batch, aged to represent a 60-day shelf life stability study (total of 240 carriers plus 360 carriers equals 600 carriers). No growth is acceptable in any of the subculture or resubculture tubes from the 600 carriers. Any pesticide which is recommended for use as a sterilizing agent in a specific device must be tested by the AOAC Sporicidal Test in the device intended for use. The test procedure may be modified to allow for valid evaluation in the specific device in which the pesticide is tested.

(8) *Virucides.* Until an official method is available, any virological technique recognized as technically sound can be used to develop data to support virucidal claims. The technique employed must simulate actual in-use conditions insofar as possible. See Appendix Part IV.A for a suggested test method, Methods for Evaluating the Virucidal Activity of Disinfectants.

(9) *Sanitizers (Nonfood Contact Surfaces).* Many household products are detergent-sanitizer or detergent-disinfectant formulations. These products must be reasonably effective as cleaners and also fulfill the requirements for a sanitizer or disinfectant, as the case may be. No standard AOAC method exists for testing the efficacy of abrasive powders, foams or creams; however, a modification of the AOAC Use-Dilution Method is suggested in Appendix Part IV.A. Other products for household or institutional use bearing sanitizing claims for nonfood contact surfaces must be evaluated by the procedure outlined in Appendix Part IV.A.

(10) *Sanitizing Rinses (Food Contact Surfaces).* (i) Sanitizing rinse claims for iodophors, mixed halides and chlorine-bearing chemicals must be substantiated with efficacy data derived from the AOAC Available Chlorine Germicidal Equivalent Concentration Method. Data from one test on each of 3 samples representing 3 different batches tested against *S. typhosa* are required. Test results must show product concentrations equivalent in activity to 50, 100 and 200 ppm of available chlorine (reference standard sodium hypochlorite). Data from duplicate samples of one of these batches, representing a 60-day shelf life stability study, showing product concentrations equivalent in activity to the 3 reference standards, must be furnished. Chemical analyses may be substituted for biological testing on the 60-day sample.

(ii) Sanitizing rinse claims for quaternary ammonium compounds, chlorinated trisodium phosphate and anionic detergent-acid formulations must be substantiated with efficacy data derived from the AOAC Germidical and Detergent Sanitizers Method. Data from one test on each of 3 different batches against both *Escherichia coli* and *S. aureus* are required, along with data from duplicate samples of one of these batches representing a 60-day shelf life stability study against *E. coli*. When claims for the effectiveness of the product in hard water are made, data derived from tests on duplicate samples of one batch against both *E. coli* and *S. aureus* are required at the hard water tolerance claimed.

(iii) In testing the efficacy of detergent sanitizers, the AOAC standardized tests may have to be modified to include appropriate neutralizers that are not specified in the methods. In testing chlorinated trisodium phosphate, for example, sodium thiosulfate is required to neutralize the residual chlorine.

(11) *Floor waxes.* In general, claims are restricted to a bacteriostatic level of efficacy after application on flooring. Tests on representative surfaces coated with the wax are carried out in seeded agar or by an agar overlay technique. Since there is no recognized standard test for demonstrating efficacy and practical value of antibacterial floor waxes, it is suggested that written protocols of proposed tests be provided for review before the initiation of the tests.

(e) *Products for use on fabrics and textiles*—(1) *Laundry additives.* (i) Residual bacteriostatic claims for laundry additives must be substantiated with efficacy data derived from the AOAC Bacteriostatic Activity of Laundry Additives Method. Three samples representing 3 product batches must be tested against S. aureus and Klebsiella pneumoniae (aberrant, ATCC 4352) using 5, 1-sq in. treated swatches on seeded agar. Duplicate samples of one batch representing 60-day shelf life stability must be tested with 5 replicate fabric swatches on agar seeded with S. aureus.

(ii) Residual self-sanitizing claims should be substantiated by the suggested test method outlined in Appendix Part IV.A. Reasonable modification of the method or alternate test methods may be accepted: *Provided*, That they are submitted for review before testing.

(iii) For products bearing sanitizing claims, the Petrocci and Clarke Method (Appendix Part IV.A) may be employed to provide efficacy data, since no official test method is available. The test organisms are K. pneumoniae (ATCC 4352 or ATCC 13906) and S. aureus (ATCC 6558). Tests may also be conducted in a washing machine. General protocols, propagation of cultures, fabric-to-water ratios, test materials, water temperatures and subculture media must be the same as those specified in the Petrocci and Clarke method. Tests must be conducted with 3 samples representing 3 product batches; each sample must be tested with 3 replicate fabric swatches against the 2 test bacteria. One sample representing a 60-day shelf life storage must be tested in duplicate against S. aureus. A 99.9 percent reduction in bacteria over the control count must be demonstrated within 10 minutes.

(iv) The Petrocci and Clarke method is also employed to support disinfecting claims, and, again, the tests are conducted with 3 samples representing 3 product batches. Each sample must be tested with 30 replicate fabric swatches against the 2 test bacteria. One sample representing 60-day shelf life storage must be tested in duplicate with 15 swatches against S. aureus. The method must be modified to include testing both the fabric and the wash water (5 ml from the automatic washer or 0.5 ml from the container with the test device) in individual widemouth jars containing subculture media and neutralizers. The wash water-to-media volume ratio should not exceed 1:40. Growth or no growth is noted after 48-hr incubation.

(v) No data are required for laundry additives containing sodium-calcium hypochlorites, sodium-potassium dichloro-s-triazinetrione or trichloro-s-triazinetrione as sole ingredients when a concentration of at least 200 ppm available chlorine is provided in the use dilution.

(2) *Textile additives.* Representative treated textiles must be tested as outlined in the current Technical Manual of the American Association of Textile Chemists and Colorists, Method AATCC 30-1971. (See Appendix Part IV.A for sampling protocols.)

(3) *Carpet Sanitizers.* No final official method exists for testing the efficacy of carpet sanitizers; however, a tentative method has been developed by AOAC (Appendix Part IV.A). If this test is employed to derive data to support the registration of a carpet sanitizer, the following protocols must be considered:

(i) Three product samples representing 3 separate batches must be tested against S. aureus and Enterobacter aerogenes with 2 different types of carpet. A 99.9 percent reduction of test bacteria over the control count must be demonstrated in each case. No carpeting is available to serve as a standard. If the product is intended for use on synthetic carpeting, 2 representative carpets, such as acrylic and polypropylene tufted-loop types may be tested. If the product is also intended for use on wool carpeting, a representative sample must be tested. If not, the label must bear a disclaimer for use on wool. All carpet samples tested must be fully identified by the pile fibre type, pile yarn weight of finished carpet, pile density and tuft height. Adequate controls must demonstrate that bacteriostatic agents in the carpet pile or backing do not interfere with the test results.

(ii) One sample, representing a 60-day shelf life stability study, must be tested with one carpet sample and one test bacterium.

(iii) The amount of sanitizer applied to a piece of carpet must be extrapolated to a volume of diluted shampoo per specified area of carpet, and the volume of diluted shampoo must be declared on the proposed label. The volume should be equivalent to 12 gal of dilute product per 800 to 1200 sq ft of carpet. If the application is intended for hospitals, a wet vacuum pickup must be specified in the label directions. In no case will the so-called "dry shampoo treatment" be registered for hospital use. Claims for disinfecting carpets are not acceptable.

(f) *Air sanitizers.* No standard method of evaluating air sanitizers has been adopted. Reports by Stuart and Friedl, McGray, and the British Standards Institution (Appendix Part IV.A) describe methods of testing aerosol products designed for temporary sanitization of air spaces. Several investigators have shown that the incorporation of glycols (triethylene, propylene or dipropylene glycol) at concentrations of 5 to 10 percent in pressurized formulations will significantly reduce airborne bacteria when adequate vapor concentrations are achieved. Currently, then, registration requirements regarding efficacy are satisfied by chemical analysis data showing appropriate concentrations of glycols. Air sanitizing products that do not contain such concentrations of glycols must be evaluated in a room or a chamber; a significant reduction in airborne microorganisms must be demonstrated. The primary test organism is S. aureus. Depending on the intended use pattern, other organisms, such as Salmonella or Pseudomonas, may also be used to provide efficacy data.

(g) *Processing and industrial uses*—(1) *Material preservatives, bacteriostats and self-sanitizers.* Material preservatives, bacteriostats and self-sanitizers defined as pesticides must be carefully assessed as to their practical value relative to the claims made before the products are proposed for registration. Simple demonstration of bacteriostatic activity or reduction of bacterial numbers on bacterial media is not sufficient to establish the practical efficacy of such products. Since there is no recognized standard test for demonstrating efficacy and practical value of material preservatives, bacteriostats and self-sanitizers, it is suggested that written protocols of proposed tests for efficacy be provided for review before the initiation of the tsets.

(2) *In-can paint preservatives.* Chemicals proposed for use as preservatives in paint formulations are identified as pesticides. Paints containing preservatives are not identified as pesticides unless pesticide claims are made or implied. Products proposed for use in preserving water-based paints must show effectiveness in at least 2 representative paint formulations in which the product is intended for use. Tests must be carred out in at least 3 preparations of each of the 2 formulations using pertinent microorganisms and adequate controls. Both test and control samples must be tested for a period of 6 mo to 1 yr. The data must show that no deterioration affecting paint quality occurred during the test period. The American Society for Testing and Materials Test Method D-2574 67T may be referred to for guidance on test protocol. A copy of the test method and a detailed description of the materials and equipment used must be provided.

(3) *Paper coatings, wet-end additives and adhesives.* Data must be provided showing effectiveness in applicable substances with appropriate microorganisms. Tests must be carried out in triplicate with each substance for a period ranging from several days to a year depending on the intended end-use. A complete description of the test protocol must be furnished.

(4) *Plastic formulations.* Data must be furnished to show that the product is capable of inhibiting the growth of bacteria which commonly deteriorate such formulations. For emulsions and liquid formulations, 3 replicate tests with adequate controls must be carred out for a period of at least 5 days. A copy of the test method and a detailed description of the materials and equipment used must be provided. For finished products, zones of inhibition must be demonstrated on seeded agar plates using 5, 1-in-sq test samples of material (providing 20 test edges) for each organism. For formulations which may be highly substantive to the impregnated material, a seeded agar overlay procedure may be required to demonstrate effectiveness. Information on the duration of activity in the finished product must be provided.

(5) *Leather preservation during processing.* Data based on field-derived observations using plate-counts of gross bacterial numbers must be submitted to demonstrate inhibition of bacterial growth and the time interval for which control may be expected.

(6) *Metalworking Cutting Fluids.* The product must be tested in an identified cutting fluid formulation inoculated with Pseudomonas aeruginosa, Enterobacter aerogenes (ATCC 13048), Pseudomonas fluorescens (ATCC 13525), and Staphylococcus aureus, each at a concentration of 1 million cells per ml of cutting fluid. The test must be carried out for at least 60 days with reinoculation after the first 30 days and must demonstrate control or inhibition of bacterial growth at 25-28° C. Three replicate tests must be carried out using adequate controls. A complete description of the test protocols employed must be furnished.

(7) *Antimicrobial fuel additives.* (i) Products proposed for use in this category must show the necessity of the additive for control of bacterial growths in the water phase of the fuel. Generally, kerosene-based fuels subject to water contamination by condensation may be subject to bacterial growths. Jet aviation fuels have been extensively studied with regard to such growths and the attendant deterioration of aircraft fuel tanks. A limited amount of information exists as to the need for control of bacteria in diesel fuels or heating oils stored in metal tanks. No bacterial problems currently exist with respect to aviation or surface vehicle gasolines. With aviation fuel additives, the Federal Aviation Administration (FAA) should be consulted as to the appropriateness of an additive from the standpoint of certification for particular airframes or engines.

(ii) Efficacy data developed using Bushnell-Haas media (Appendix Part IV.A) plus the fuel (the fuel-to-liquid media ratio must be equivalent to that found in the field), inoculated with a mixed culture of bacteria and fungi isolated from the water phase of contaminated fuel and treated at the concentration recommended on the label, would serve to presumptively substantiate the efficacy of a product. A minimum of 3 replicate tests should be carried out for at least 14 days.

(iii) Based on these data, products proposed for use in engines and/or airframes of aircraft would require testing according to the requirements specified in FAA Advisory Circular AC 20–24A, dated April 14, 1967, under an Experimental Use Permit issued by the Registration Division. Where an additive has not been certified for use in a particular aircraft engine and/or airframe, then such use should be disclaimed on the label. It is essential that any collateral technical bulletins which accompany the product be submitted for review.

(iv) Any other proposed uses (diesel fuels, heating oils) would require derivation of efficacy data under an Experimental Permit, after presumptive efficacy was established in Bushnell-Haas media as noted above.

(v) Consideration must also be given to the potential addition of pollutants in exhaust emissions of internal combustion engines using fuels with the proposed additive. The applicant may need to confer with personnel of the Mobile Source Pollution Control Program, Environmental Protection Agency, for additional requirements.

(8) *Antimicrobial additives for sugar mills.* Products bearing claims of effectiveness in controlling bacterial growths in sugar mill operations must be substantiated with both laboratory and field-derived data. Laboratory data showing the effectiveness of the product in inhibiting the growth of or reducing the numbers of representative Leuconostic mesenteroides isolated from spoiled cane or beet sugar pressings must be provided. Field-derived data should be developed under an Experimental Use Permit demonstrating the efficacy of the product used as directed. A food additive tolerance must be established before the product is registered.

(9) *Miscellaneous preservative uses.* Preservatives recommended for use in cosmetics, ceramic glazes, grouts, floor wax emulsions, gaskets (paper felt, cork, rubber, vinyl), films and foams of polyvinyl and polyurethane, dextrin-based inks, photographic solutions, laundry starch, and colloidal graphite should be tested in all end products or representative formulations to substantiate preservative claims. It is suggested that proposed test protocols be submitted for review before initiation of test studies, since no standard methods for evaluating preservatives are available at this time.

§ 162.66 Specific considerations: Aquatic pest control agents.

(a) Applying pesticides to water magnifies actual or potential unreasonable adverse impacts on man and the environment. Contamination can extend to surface waters, ground waters and aquifers used for, or in the production of, drinking, irrigation or industrial process water. Contamination of desirable plants and animals may lead to collapse of a species and/or economic losses. Bioconcentration of pesticide residues in the food chain or direct ingestion of pesticides in water may represent a potential long-term hazard to man. Thus most aquatic uses of pesticides must be covered by an established tolerance or an exemption from the requirements for a tolerance.

(b) *Drinking Water Systems (Human).* The AOAC method for evaluating swimming pool water disinfectants (Appendix Part IV.B) is currently the most applicable standardized test for disinfectants in drinking water.

(c) *Drinking Water Systems (Poultry and Livestock).* Directions for the treatment of drinking water for poultry and other food animals that include or imply claims to control disease in these animals require clearance from the Food and Drug Administration before registration can be issued. Relatively high concentrations of products may be required for effectiveness because of the probability of contamination with feed and fecal matter by the animals themselves and because, in the presence of most forms or organic matter, effectiveness is markedly decreased or eliminated. Claims for the control of specified microparasites and algae may require submission of laboratory and/or field data. Tests must be designed to evaluate the product's performance in contaminated water.

(d) *Weeds.* Performance information on a pesticidal product intended to control aquatic weeds must be derived from in-use tests. The tests must:

(1) Include a geographical distribution of test sites that reflect various water types, temperatures and other environmental factors influencing effectiveness.

(2) Be made with the highest concentration of the product in water which will not injure crops or desirable vegetation if the treated water is to be used for irrigation. This level is to be considered as the highest acceptable for registration.

(3) Establish the concentrations of the product in water (as a result of proposed application) and the decline of that concentration with time and/or distance of flow. It must be shown that the use of treated water can be controlled during the time and/or distance of flow required for the concentration to decline to nontoxic levels. Appropriate statistical analyses of the data and development of depletion curves are essential.

(4) Reports must include the types of aquatic sites, the dosages, the degree of weed infestation, the types of weeds, the physical measurement of the treated area and of the whole site, and the time of each application in terms of date and in terms of the stage of growth of the weeds.

(e) *Fish and mollusks.* (1) Pesticides here may be classified as fish poisons, fish repellents and freshwater molluscicides. These products may be formulated as dusts, granules or sprays. Their effectiveness depends on many variables, including:

(i) The target species.

(ii) The site of application (lakes, ponds, streams, rivers, estuaries).

(iii) The characteristics of the water (salinity, hardness, pH, sedimentary load, temperature, etc.).

(iv) The length of time that the pest organism is exposed to a given concentration of the pesticide.

(v) The concentration or dosages of the pesticide, usually expressed in parts per million and in equivalent amounts of product per unit volume of water.

Their usefulness will be dependent on their adverse effects, such as reducing mollusks as intermediate hosts of parasites of man and other animals.

(2) The following outline summarizes major considerations in testing fish and mollusc control agents.

I. Fish poisons and freshwater molluscicides

A. Laboratory studies

1. Physical-chemical properties of the active ingredient(s)

2. Preliminary screening (static or continuous flow test to show LC–50's at 24, 48, 96 hr or longer using target species. The exact toxicological studies to be performed depend upon the nature of the chemical, method of application, and intended claims. The tests indicated are for toxicants applied to water.)

3. Delineative screening (static or flow test to show LC–100's at 24, 48, 96 hr or longer)

4. Effect of each active ingredient

5. Physiological effect of product

6. Diluent (wetting agents, emulsifiers and synergists) effect on product efficacy

7. Effects of water quality, temperature and turbidity

8. Specificity (species and product action)

9. Phytotoxicity

10. Detoxifying agent

B. Field studies

1. Preliminary field studies (wading pools, ponds, small streams)

a. Biological activity of product at various water qualities for target species throughout their life cycle

b. Method of application and dose effect on target species

c. Method of application and dose levels for partial and/or selective kills

d. Detoxification time (or restocking interval)

e. Phytotoxicity

2. Advanced field studies (Experimental Use Permit may be required.)

a. Regional product testing

b. Application effect and significance

c. Detoxification time (restocking interval)

II. Fish repellents

A. Laboratory studies

1. Physical-chemical properties of active ingredient(s)

2. Acute and subacute toxicity studies on target species (The studies required will depend upon the mode of action of the active ingredient(s), intended claims, method of application and other factors.)

3. Effects of product on individual and group behavior

4. Activity of each active ingredient

5. Dose response to the product

6. Method of application and effect on response

7. Rate, duration and significance of response

B. Field studies

1. Preliminary field studies (ponds, lakes and streams)
   a. Water quality factors affecting efficacy
   b. Other environmental factors affecting efficacy
   c. Method of application and effect on response of target species
   d. Rate and duration of individual and group behavioral change
   e. Phytotoxicity
2. Advanced field studies (Experimental Use Permit may be required.)
   a. Regional testing required
   b. Environmental factors affecting efficacy
   c. Method of application and dose response
   d. Rate, duration and significance of individual and group behavioral change

(f) *Swimming pools.* (1) Disinfectants recommended for use in swimming pool water must be applied at concentrations considerably greater than those recommended for treating human drinking water. Numerous factors influence the concentrations necessary for effectiveness in practical applications: Numbers of swimmers in the pool; frequency of use; frequency with which water is changed; general weather conditions; and types and degree of organic contamination of the water by the swimmers themselves, for example, suntan lotions and oils and various debris.

(2) Swimming pool water disinfectant claims must be substantiated with efficacy data derived from the AOAC Method for Water Disinfectants for Swimming Pools (Appendix Part IV.B). Data from one test on each of 3 different batches against both *E. coli* and *Streptococcus faecalis* are required. Data from duplicate samples of one batch representing a 60-day shelf life stability study against *E. coli* must be submitted. Products marketed as tablets, sticks, briquettes or other slow-dissolving forms require submission of data on solubility rates and field data demonstrating effectiveness in maintaining the required chlorine residual when used as directed.

(3) The preceding data requirements for swimming pool water disinfection do not apply to simple formulations of sodium and calcium hypochlorites, sodium and potassium dichloro-s-triazinetriones, or trichloro-s-triazinetrione when adequate directions for pool water maintenance are provided on the product label.

(4) Algaecide tests are conducted in the laboratory using a recognized standard procedure such as the Fitzgerald test (Appendix Part IV.B). Confirming data are also required from in-use tests in swimming pools of different sizes located in different regions of the country. The number of tests needed will depend on the degree of variability found.

(g) *Industrial Cooling Water Systems.* (1) Products intended to control microbiological slimes in cooling water systems include those with algaecidal, bactericidal and fungicidal activity. Microbiological slimes here means the microorganisms (algae, bacteria and fungi) and their secretions, plus embedded debris. The following terms and definitions are particularly pertinent.

Bactericide. As defined here, the term is restricted to products used in cooling water and must not be related to products represented or defined as disinfectants.

Blowdown (bleed-off). Water discharged from the system to control concentrations of salts or other impurities in the circulating water. Blowdown is measured in gallons per minute.

Closed recirculating systems. Essentially all the water is continuously recycled and the heat is removed from the circulating water in a heat exchanger that may be cooled by air, mechanical refrigeration or a separate open cooling-water system.

Makeup water. Water added to the circulating water system to replace that lost because of blowdown (bleed-off), drift, evaporation, leakage and overflow.

Microbiocide. Any substance or mixture of substances which effectively reduce the number of algae, bacteria and fungi.

Once-through systems. Water is taken from some primary source, used for cooling, and then discharged to waste or used for other purposes.

Open recirculating systems. A major portion of the water used for process cooling is continuously recycled through some type of evaporative cooling device, such as a cooling tower, to remove the heat picked up and is then used again for process cooling.

(2) The data requirements for these products include laboratory data that must be submitted to show the presumptive effectiveness of the product against algae, bacteria and/or fungi. These data may be minimum inhibitory concentration determinations. If the product contains a new chemical or chemicals, the antimicrobial activity, if any, of each such ingredient must be determined against the intended organisms and reported.

(3) Based on the laboratory data, the product must be tested to determine an acceptable dosage range and pattern of use in water systems for which the product is intended. Such testing usually requires an Experimental Use Permit.

(4) Tests should be made in at least 2 different climatic locations for a period of not less than 30 days. Test systems should be representative of the more severe conditions that the product is intended to control. Reports must include, but are not limited to, the following:

(i) Dosage applied at each treatment.

(ii) Interval between treatments.

(iii) Visual or other suitable ratings of the nature and amount of microbial growth. (The rating scale should be defined, and the commercially acceptable level of control should be indicated.)

(iv) Total volume in the system.

(v) Percent blowdown, if applicable, per unit of time.

(vi) The volume of makeup water added to the system during the test period.

(vii) Water characteristics, such as pH, hardness, temperatures, and identification of any anticorrosion inhibitors, together with an estimate of their concentration in the system, and identification of any antimicrobial chemicals that were used immediately before or during the test period.

(viii) All appropriate engineering data reflecting efficient operation of the system, such as heat transfer readings, head pressures and downtime. Baseline data on each parameter used is necessary for comparative purposes.

(ix) Microbial counts before and after treatment to determine the required interval(s) between applications and to indicate the degree of control obtained.

(x) Where, when and by whom the tests were conducted.

(h) *Pulp and Papermill Water Systems.* (1) Treatment of these systems with pesticides may result in residues in finished paper or paperboard. Residues, occurring in finished products intended for use in contact with food, must be covered by a tolerance or an exemption.

(2) Laboratory data must be submitted to show the presumptive effectiveness of the product against bacteria and fungi. These data should include at least minimum inhibitory concentrations and/or count reduction determinations. Standard methods of testing have not been developed; however, tests should be conducted at temperatures frequently encountered in the mill system. Representative species of bacteria and fungi employed in obtaining presumptive effectiveness data must include, but are not limited to, Aspergillus niger (Institute of Paper Chemistry No. 106), Chaetomium globosum (ATCC 6205), Pseudomonas aeruginosa (ATCC 10145) and Klebsiella pneumoniae (ATCC 8308).

(3) Based on the laboratory data, the product must be tested to determine an acceptable dosage range and pattern of use in mill systems. Such testing usually requires an Experimental Use Permit.

(4) Tests should be made in at least 2 domestic papermills manufacturing different types of paper or paperboard, such as newsprint, fine papers, tissue or liner board. Each test should be conducted for not less than 4 wk. Mill conditions should be representative of the more severe conditions usually experienced. Reports must include but are not limited to:

(i) Dosage applied at each treatment.

(ii) Interval between treatments.

(iii) Visual or other suitable ratings of the nature and amount of slime growth. The rating system should be defined and the commercially acceptable level of control indicated.

(iv) Water characteristics, such as pH, hardness, temperature, and presence of nonpesticidal additives (for example, corrosion or foam inhibitors).

(v) Identification of slimicide used before the test, if possible.

(vi) Description of the pulp source (soft or hardwood) and its consistency at the point of application.

(vii) Bacterial and fungal counts before and after treatment, together with visual and tactile observations and operating characteristics (slime breaks, etc.).

(viii) Rate of dissolution of solid form products, such as balls and briquettes, under the conditions of use in each mill.

(ix) History of slime problems.

(x) Where, when and by whom the tests were conducted.

(5) Similar data developed in foreign countries are acceptable if the data have been obtained in 3 mills where climatological conditions and the microorganisms encountered are like those found in domestic mills.

(i) *Secondary Oil Recovery Systems.* The American Petroleum Institute (API) Recommended Practice for Biological Analyses of Subsurface Injection Water Test (Appendix Part IV.B) is an acceptable method for assessing the efficacy of products against Desulfovibrio desulfuricans (API), Bacillus cereus (API), and Pseudomonas fluorescens (API). The test must be carried out in duplicate, and a copy of the API test procedure must be submitted.

§ 162.67 Specific considerations: Fungicides and nematicides.

(a) The term fungicide as used here means any substance or mixture of substances intended to prevent, destroy, repel or mitigate fungi. Fungus includes any nonchlorophyll-bearing thallophyte of a lower order than mosses and liverworts, such as rust, smut, mildew, mold, yeast and bacteria, except those on or in living man or other animals and those on or in processed foods, beverages, or pharmaceuticals.[3]

(b) The term nematicide means any substance or mixture of substances intended to prevent, destroy, repel or mitigate nematodes inhabiting soil, water, plants or plant parts. It excludes products intended for use against nematodes in or on living man or other animals. Nematode includes invertebrate animals of the phylum Nemathelminthes and class Nematoda, that is, unsegmented roundworms with elongated, fusiform, or saclike bodies covered with cuticle.

(c) Soilborne pests: (1) Tests for fungicides and nematicides applied to soil must be designed to prove effectiveness against different soil-inhabiting organisms present in various soil types under similar and dissimilar climatic conditions. Crop plant safety, or lack of phytotoxicity, is very important and precautions to ensure against harmful effects are often needed in the directions for use. Taste panel tests are frequently important on crops (especially root crops) grown in treated soil.

(2) The control of soil-inhabiting fungi and/or nematode plant parasites may be accomplished with a variety of formulation types and methods of application. Dusts, granules, liquid drenches and fumigants (liquid-to-vapor) may be applied broadcast, in bands over or under the row, in furrows at planting time, or as a transplant or postplant drench treatment; sprays of downward translocating products may also be applied to foliage. All specialized application equipment and techniques should be adequately described.

(3) Data which show beneficial effects such as plant growth or yield increase as the sole proof of effectiveness are unacceptable, and some evidence of pest control and/or symptom repression must also be provided.

(4) Depending upon the fungus or nematode and crop involved, important parameters to be measured may include, but are not limited to, one or more of the following:

(i) Crop emergence.

(ii) Crop and pest mortality or survival.

(iii) Crop stand count.

(iv) Crop lodging.

(v) Crop root injury.

(vi) Disease-free or marketable crop yield.

(vii) Crop yield or growth response.

(viii) Pest and/or symptom expression ratings.

(5) When a general nematode claim is desired, effectiveness data must be submitted to demonstrate control of at least one species of root-knot, cyst, migratory endoparasitic nematode, and ectoparasitic nematode of importance on the crop(s) or crop planting site(s) to be treated. If the test results indicate that the product will not control all the important nematodes associated with a given site, claims must be limited to the specific type or types that can be controlled. Nematode control may be effectively evaluated by one or more of the following criteria:

(i) The percent infection or root-knot index—degree of galling on roots of carefully dug plants compared with untreated checks and/or standards (root-knot nematodes).

(ii) Number of nematodes per unit volume or weight of soil compared with untreated samples (all nematodes).

(iii) Number of nematodes per unit measure of roots or other plant parts compared with untreated checks (lesion and other endoparasitic nematodes).

(iv) Number of cysts containing viable eggs and/or larvae in soil and/or on roots compared with untreated checks (cyst nematodes).

(6) The overall results should statistically demonstrate that nematode control achieves a desired quality, quantity or other measurable crop benefit. Pest population densities should be ascertained before treatment, and population comparisons should be made between treated and untreated plots before or at treatment and at proper intervals thereafter.

(7) Proper sampling times will vary depending upon the nature of the chemical and the type of crop and nematode. Final populations in treated plots often exceed those in untreated plots, particularly when early season control results in increased plant growth. For this reason, a trained nematologist is needed for proper evaluation. (See Appendix Part IV.C).

(d) Postharvest fruits and vegetables: The advanced evaluation of postharvest fruit and vegetable treatments requires replicated tests on lots varying in size from several shipping cartons to several tons. Data should be taken after arrival at the destination following actual or simulated packing and transportation procedures for the particular crop to be investigated. When crops are treated before or during storage, the data should give disease counts after varying periods of storage. These counts may be stated in terms of percent of total produce showing symptoms or signs of disease. Usually, separate tests must be conducted on each different fruit or vegetable and for each organism to be controlled. If, however, sufficient levels of 2 or more disease organisms are present on the same host simultaneously, their control may be evaluated in the same test. Disease control data on artificially inoculated produce is also acceptable. The product should be tested with each type of equipment (bin-type dumpers, tank washers, spray washers, brush cleaners, hydrocoolers, and similar devices) which may be named or implied in the directions for use.

(e) Grain preservatives: (1) Fungicides to be used to preserve stored, high-moisture grains can be evaluated in laboratory tests and in-use field-tests. Such testing should include treatments representing a range of dosages and moisture levels. Since high-moisture grain generally implies a moisture content of at least 15 percent, grain moisture may be reconstituted by the addition of water. Moisture levels of 17 to 20 percent will assure more rapid growth of molds and quicker results. Effectiveness evaluations, for both laboratory tests and in-use field-tests, must include comparisons between treated and untreated grain. These evaluations are based on visible mold growth and auxiliary criteria such as temperature rise, respiration rate and weight loss of stored grain.

(2) Laboratory tests should be designed to obtain the presumptive dosage rate(s) necessary to control fungi in or on naturally infested or artificially inoculated grain (mainly with species of Aspergillus, Alternaria and Penicillium). If grain moisture is reconstituted, Fusarium may be used. Experimental units of grain usually range from 1 qt to 25 gal, partially closed glass or plastic containers; 1-qt thermos bottles are often convenient. Tests should be conducted under a variety of controlled conditions.

(3) Once the preliminary efficacy of the product is established in the laboratory, more advanced tests must be conducted under actual in-use storage conditions. Such tests should be performed in either exposed outdoor bins of at least 100-bu capacity, or unexposed outdoor bins (contained within a shed or other similar type of shelter) of at least 10-bu capacity. Tests must contain a minimum of 2 (preferably more) replicates for each treatment. The fungicide should be tested at proposed application rates in several geographic locations where grain is commercially produced and stored. In-use storage testing optimally should begin soon after the grain is normally har-

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[3] This statement appears in the amended FIFRA; however, since passage of this law, the classification of bacteria has been changed. Bacteria are no longer classified as fungi, according to Bergey's Manual of Determinative Bacteriology, Eighth Edition, 1974.

vested. The duration of testing should correspond with claims to be made on the labeling (generally 6 to 12 mo). Applicable data should be recorded periodically during storage.

(4) Depending upon the end use of treated grain, additional studies may be required. If use in animal feeds is intended, appropriate feeding studies must be performed, preferably with poultry and cattle, to demonstrate the acceptability of treated feeds. If grain is to be used for planting, laboratory data must be presented to show that treatment does not cause excessive phytotoxicity. Pronounced delays in germination or emergence would necessitate further testing under field conditions. (See also following topic on seed treatments.)

(f) Seed treatments: (1) Seed treatments should be evaluated in either laboratory, greenhouse or field-tests, utilizing heavily infested seed and/or soil known to contain specific, disease-producing fungi.

(2) Soilborne disease control, such as seed decay and seedling blight, may be evaluated in extensive laboratory and greenhouse testing, provided that, where necessary, results are supported by a limited number of field-tests. Extensive geographical distribution of field-tests is not necessary to support claims for seed decay and seedling blight control. In the laboratory and greenhouse testing, disease incidence can be assured by initially slowing germination with reduced temperatures (cold test) or by boosting inoculum levels of specific pathogens. Results are usually presented as percent emergence and percent survival on 2 or more dates while plants are in the seedling stage. Pronounced delays in germination or emergence require field-testing to assure that the treatment does not cause excessive phytotoxicity.

(3) Seedborne disease control, such as blights, rusts and smuts, should be tested under different soil and climatic field conditions in areas where the crop is likely to be grown. Evaluations should be made of emergence, stand, percent disease and yields if applicable.

(4) Treatment should be applied by commercial equipment or reasonable facsimiles which provide the same coverage. In field-tests, well replicated small plots should be used with seeding rates and plant spacings comparable to general cultural practice. The number of replications and the size of each plot should be consistent with the known variability of the soil, the character of the disease and the anticipated disease incidence. Tests in any one location might vary from 4 to 6 replicates of single rod-rows, or equivalent (about 200 plants), for small grains and other small seeded crops, to 4 to 6 replicates of 50 to 100 plants in each of one or 2 rows for cotton, peanuts and other large seeded crops. Larger plots will be needed if samples are to be collected for residue analysis, if grower planting or harvesting equipment is to be used, or if disease incidence is expected to be low.

(5) Tests should be designed to span several planting dates and locations to cover a range of conditions, and usually, to test several of the principal varieties of each crop for phytotoxic response. It is desirable to have seed treatment materials evaluated in regional trials, such as those run by the Regional Cotton Seed Treatment Committee of the Cotton Disease Council.

(g) Ornamental and flowering plants: Final-stage testing of fungicides and nematicides for use on ornamental plants should be conducted in field or greenhouse plots depending on the intended use of the product. Replicated plots of 10 to 1000 or more sq ft each are acceptable. In the case of florists' crops, no detectable injury is usually allowed. Actual counts of disease and nematode incidences are required; the commercial growers' assessment of the product is also valuable.

(h) Bulbs, corms and tubers: Tests to control rots in ornamental bulbs, corms and tubers should be conducted with 5 or more replications of 100 or more bulbs. Apparently healthy bulbs selected from a heavily diseased stock and/or artificially inoculated bulbs should be used for disease control tests; bulbs for phytotoxicity tests should be selected from stocks as disease-free as possible. Disease counts should usually be obtained during and at the conclusion of the storage season. However, testing should usually continue throughout a complete growing and storage cycle to determine the residual activity and phytotoxicity of the product. Effectiveness evaluations are usually based on comparisons between the final yield (weight and/or size and number) of healthy and diseased bulbs within and between treatments. Separate tests should be conducted for each species and each pathogen.

(i) Trees: (1) Requirements for testing products to be used to control tree diseases are highly specialized and must be conducted by experts in that field. These would include public and private qualified forest pathologists and tree-treating experts knowledgeable in:

(i) Exact diagnosis, including symptomological and mycological aspects.

(ii) Method of treatment, including soil and tree injection techniques, sprayers, surgery, and wound dressings.

(iii) Proper evaluation techniques, including statistics where necessary.

(2) Up to 100 or more single-tree replicates of mature specimens of a given species may be required for each treatment and each control group. The number of trees necessary depends on the nature of the disease and the method of treatment. Fewer replicates are required when all specimens are the same age and vigor and growing on similar sites in relation to soil type, available water and drainage, or when transmission of disease is dependent upon climatic factors, such as wind and rain. More trees are required when any of these conditions are variable or when disease transmission is dependent upon an insect vector or the presence of root grafts. Since securing enough trees within a small area is often impossible, the tests must be carefully designed to provide valid results with replicates which may be randomly scattered over one or more contiguous counties within a general geographic and climatic area. In cases where the disease is widely distributed, separate tests from the major geographic and climatic areas will be required, or labeling claims will be limited to the specific areas of test.

(3) For trees grown in nurseries, seed and seedling bed treatments should be conducted using replicated blocks of 9 to 100 sq ft each, depending on the nature and frequency of disease incidence. Again, up to 100 or more single-tree replicates, or replicated blocks of 4 to 20 saplings each, may be required.

(j) Turf: (1) Tests on lawns and other fine turf areas should be conducted on replicated plots of 4 to 1000 or more sq ft. The size of plots and number of replicates depends on disease uniformity, expected severity and the size of application equipment. Sometimes the control of 2 or more diseases can be evaluated in the same test.

(2) To support a general claim for use on turf, lawns or grasses (non-grazing areas), data should demonstrate effectiveness against the same pathogen on at least 4 specimens: 2 cool and 2 warm season varieties of 2 types of grasses (bentgrass, bluegrass, fescue, etc.). Additional tests should be conducted on all other representative grasses likely to be treated to demonstrate that the product is not phytotoxic at dosages equal to and greater than label rates. Products intended to control diseases of Dichondra and other nongrass lawn plants must be tested on the intended hosts under their normal field conditions.

(k) Wood and wood products: (1) Products used to control marine borers, shipworms, teredos, and fungal and bacterial deterioration of raw and finished wood require registration. The products are commonly applied to logs, lumber, plywood, millworked products, paper, paperboard, paper pulp, poles and pilings, timber, wood chips, sawdust, and other wood-based material. Water repellents and sealers which do not claim to protect these products against pests are not considered pesticides and need not be registered.

(2) Numerous wood preservatives can be applied by several methods, each intended to afford protection for various periods of time and extremes of exposure. Effectiveness data must be provided to support each directed method. There are, for example, a variety of industrial applications:

(i) Applications for timber and lumber are usually based on pressure methods of impregnation; occasionally double diffusion techniques are used.

(ii) Sawmill lumber, poles and pilings may be treated by passing the freshly cut pieces through pressure tanks, dip tanks or spray hoods.

(iii) Stored chips and sawdust usually are treated by spraying the material as it moves on a conveyor belt to the storage area.

(iv) Paper pulp is protected by direct addition of the fungicide to the heavy slurry as it enters the storage chest.

(v) Lap stock may be treated by adding the fungicide to the white water system or by spraying the stock on the dry end of the machine.

(vi) When finished paper or paperboard requires protection, the fungicide is usually added as a spray at some point on the dry end of the machine or in a separate operation.

(3) Commercial applications would include dip tank methods to protect sash or other wooden assemblies, or preparations, such as grease and impregnated bandages or injectable liquids, to treat standing poles. As a final example, farm and home applications for treating fence posts and other wood placed in contact with soil would include: 2 or more flowing brush or spray coats; 3-min dips; hot and cold baths; or 12- to 24-hr soaks.

(l) Miscellaneous industrial materials and equipment. (1) Fungicides are used to protect a great variety of products and equipment. The following examples illustrate this diversity; they include broom corn, cellulose sponges, coatings, colors, cordage, drilling muds, dye baths, emulsions, fabrics, fuels, latex, leather, plastics, resins, rubber, and transportation and storage equipment. Directions for use vary with the material or equipment to be protected and with the type of product to be used. Many industrial materials are purchased under a buyer's specification for fungicidal protection, and specific test methods may be required. Products intended for such markets should be tested according to the buyer's specifications and the results should be submitted along with application for registration. Products intended for the open market should also be adequately tested. (See Appendix Part IV.C for suggested methods.)

(2) Information must also be presented showing that when used as directed, under normal conditions, no intolerable adverse effects will ensue. Such effects would include unwanted discoloration, tenderizing of fabrics, other changes in desirable physical characteristics and interference with processes or reactions.

§ 162.68 Specific considerations: Herbicides, plant regulators, desiccants and defoliants.

(a) The term herbicide means any preparation intended for preventing, destroying, repelling, or mitigating unwanted plants or plants identified as weed pests. Herbicides include, but are not limited to, those that work by direct contact, those applied as soil treatments, those applied to plant roots in drainage tiles and sewers, and those applied to algae (algaecide) or any aquatic weeds.

(b) The term plant regulator means any preparation intended for altering the behavior of plants or produce through physiological rather than physical action. Plant regulators include products intended for:

(1) Accelerating or retarding the rate of growth of maturation of plants or plant parts.

(2) Enhancing fruit set, for thinning flowers or fruits, or for preventing fruit drop.

(3) Prolonging or breaking dormancy of plants and plant parts.

(4) Accelerating root formation or the healing of wounds.

Plant regulators exclude nutrient mixtures, soil amendments, or vitamin-hormone horticultural products intended for maintenance and propagation.

(c) The term defoliant includes any preparation intended for inducing or accelerating leaf abscission in plants. The term desiccant includes any preparation intended for accelerating the drying of plant tissues.

(d) Herbicide Terminology: The following specific terminology used in labeling must be supported with adequate data:

(1) Preemergence. The pesticide is applied before emergence of the crop and after planting.

(2) Postemergence. The pesticide is applied after emergence of the crop. The method of application must be described; for example, directed, semidirected or overtop. The interval after emergence may be expressed in terms of time, but the more precise interval in terms of crop stage (and, where appropriate, pest stage) is preferred.

(3) Post-harvest planting. Phytotoxicity data are required to show satisfactory performance of the proposed crops planted in treated soil after normal harvest of original crop.

(4) Preplant. Supporting data and directions for use must specify the interval between application and crop planting. The data must also indicate whether application to unbedded fields will result in an increased concentration of the product accessible to the plant. Adequate directions must be provided on the label to avoid excessive concentrations.

(e) Rotational cropping and emergency replantings: (1) Crop plant species commonly planted in rotation on treated areas must be identified and the acceptable interval between treatment of the previous crop and the planting of each rotational crop must be given.

(2) Frequently, climatic conditions prevalent after herbicide treatment hinder crop development, and reseeding may be necessary. In this event, recommendations concerning replanting must specify the time and conditions under which the original crop, or an alternate one, may be planted, and whether an additional herbicide treatment is required.

(f) Special noncropland data requirements: (1) The term noncropland is a general category designating areas which are not normally used to grow food, feed or fiber crops. Noncropland sites vary greatly in the degree of contact by humans, domestic animals and wildlife and in the type of, or absence of, desired vegetation. On the basis of these differences, intended noncropland management practices may be classified according to the extent of weed control; that is, highly selective, selective, or nonselective weed control.

(i) Highly selective weed control would be practiced on sites with relatively high concentrations of humans and no restrictions on contact by domestic animals or wildlife. Sites include ornamental turf and shrubs around the home and recreation areas, golf courses, nurseries, highway plantings, areas around farm buildings, agricultural fence rows, urban utility distribution lines and easements.

(ii) Selective weed control would be practiced on sites which are not regularly frequented by relatively high concentrations of humans and which have no restrictions on contact by domestic animals and wildlife. Sites include forest areas, shelter belts, highway and utility rights-of-way and rain runoff drainage ditches.

(iii) Nonselective weed control would be practiced on sites in which contact by humans, domestic animals and wildlife is restricted by physical barriers. Sites include certain industrial areas, lumber yards, tank farms, and areas around utility substations and inside security fences.

(2) Performance data requirements for these sites may be categorized as follows.

(i) When the product intended for use on the first type of site is already registered for use on crops for which tolerances are established, and the dosages, patterns of use and limitations are identical, no further performance data are required.

(ii) When highly selective weed control is not intended, data requirements for products include:

(A) performance data to show the effective dosage range for control of the pests claimed and the dose-response relationship, which may be demonstrated most easily in the form of a probit or regression analysis.

(B) mobility and soil persistence data, correlated with phytotoxic response evaluation, which can be presented by regression curves.

(g) Herbicide data development. Data requirements are discussed under General Considerations. Herbicide tests should be conducted to determine the dosage range within which the product is effective without producing undesirable injury to the crop or nontarget species on adjoining sites. Control plots are included for treatment comparisons. The types of plots depend on the objectives of the experiment and may include cultivated checks, weedy checks, and/or standard treatments. Appropriate statistical analysis is usually essential for adequate interpretation.

(h) Plant regulators: Tobacco sucker control: Plant regulators useful for control of suckers on tobacco require special methods for their testing and evaluation. For protocols, see Appendix Part IV.D.

§ 162.69 Specific Considerations: Invertebrate Control Agents.

(a) Invertebrate pesticides are defined as any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any invertebrate pest present in the environment. Invertebrates here comprise any of the numerous small arthropods belonging to the class insecta; other allied arthropods, including spiders, mites, ticks, centipedes, millipedes and wood lice; and terrestrial invertebrates, including slugs and snails. (For aquatic invertebrates, see Specific Considerations: Aquatic Pest Control Agents; for nematodes, see Specific Considerations: Fungicides and Nematicides.)

(b) In addition to organic and inorganic chemicals, invertebrate pesticides include such substances as biological control agents, chemosterilants, hormones, pheromones and attractants. Test procedures and experimental data relating to the efficacy of these substances are presently considered on an individual product-by-product basis.

(c) Special comments for testing insecticides follow. One precaution to observe in any insecticide treatment is the potential harmful effect on honey bees and other beneficial insects during field-testing. Tests should be conducted to determine deleterious effects, and any observation on injury to any beneficial nontarget organism should be reported in the data.

(d) Foliar plants: (1) When testing nonsystemic insecticides, new plant growth, which must be protected against insect attack, and new populations of insects, which have hatched or moved onto the plant since the last treatment, dictate repeated applications for the length of time and at intervals that protection is needed. Uniform coverage also is essential to good insect control. Thus tests must be designed to determine correct dosages and application intervals.

(2) Testing for use on food crops in home gardens must follow the same techniques outlined under General Considerations for the product's commercial use. (See also Appendix Part IV.E.)

(e) Dormant plants: Treatments to dormant plants should be applied so that the insecticide will contact the overwintering stage of the pest or a residue of the insecticide will be deposited where it will be effective against the emerging pest.

(f) Livestock, poultry, fur and wool-bearing animals: (1) Insecticides which are tested for use on livestock, poultry, fur or wool-bearing animals should not injure the animal even when application is repeated frequently over a long period of time; the margin of safety to the treated animal is a vital consideration in determining usefulness. Neither should the insecticides appear illegally in or on meat, meat byproducts or eggs. If the treated animal is less than 3 mo of age, stress conditions created by a particular method of treatment must be evaluated along with the toxicity data.

(2) Certain petroleum oil fractions are used extensively as components in formulations to be used on livestock. In testing such formulations, the possible effects on the animal from toxicity of the petroleum oil must be considered. For example, small amounts of some solvents such as xylene and toluene may cause tolerable minor itching and burning for short periods after application. Higher concentrations, say 25 percent, may cause death if not diluted before application. Based on past experience, certain criteria for testing these compounds have been developed:

(i) Ready-to-use oil solutions of insecticides recommended for use on livestock as mist sprays generally must be applied at rates not exceeding 2 oz per large animal (cattle, horses, etc.) and 1 oz per animal for small animals (sheep, swine, goats, etc.) on a per-day or per-application basis.

(ii) Pour-on and other ready-to-use products containing oils must be tested to ensure that the recommended method of treatment will not result in excessive dosages of oil which may evoke adverse reactions in treated animals.

(iii) Emulsifiable concentrates must be tested to ensure that the final use dilution does not contain dangerous amounts of oil.

(3) Dust bag products and devices should be tested in protected, dry areas, since the dust will often tend to harden when wet and render the product ineffective. A suitable discussion of the formulations, unit locations, and characteristics of the device, such as amount dispensed, type of construction, length, and porosity, should be included in the testing procedures for these applications.

(4) Dusts may also be applied manually to livestock as neck and back treatment or by dusting the entire animal. Some test chemicals may be applied lightly on the surface of the hide; others must be rubbed in thoroughly to penetrate the hide and reach the skin.

(5) Pests of dairy cattle include various biting flies (horn and stable flies), lice, ticks, houseflies, face flies, mosquitoes and sarcoptic mange mites. Evaluating an insecticide that is to be applied directly to the cattle to control these pests should be based on adequate small-scale tests on representative animals from dairy herds in at least 5 widely separate regions where the insecticide is to be marketed. Tests should follow a prescribed schedule using dosages both above and below the anticipated optimum. The probable levels of dosage and concentrations needed should be identified in laboratory or small-scale tests before the field-testing. Although it is usually necessary to repeat the application only once or twice for lice, ticks and sarcoptic mange mites, a schedule of repeated applications is normally required against flies and their continuous population pressures.

(6) Because untreated control herds are usually impractical to maintain, the effectiveness of the test product may be measured by comparative treatments with registered products applied to portions of the test herds. Pretreatment pest counts are an essential aspect of the test protocol. Records should be submitted on the comparative changes in milk production; and insect counts following each treatment to evaluate the effect of treatments.

(g) *Lawns and ornamental turf:* Lawns and ornamental turf are treated with insecticides by broadcast applications. Dusts may be applied with a hand duster or lawn fertilizer spreader; granules and dry baits, with a lawn fertilizer spreader; wettable powders and emulsifiable concentrates (after dilution with water), with a compressed air on knapsack sprayer, a hose proportioner or a watering can. It is important to observe any phytotoxic effects which might occur after treatment, since grasses or other lawn plants differ significantly in their sensitivity to chemicals, and some high quality lawn and golf greens represent a sizeable monetary investment.

(h) Forest lands and roadsides: The use of insecticides on forest lands and roadsides (parks and picnic areas) is frequently under the supervision of Federal or State forest services or county or municipal public officials. Whenever possible, testing insecticides for use in these areas should be in close cooperation or consultation with these officials.

(i) Mosquito abatement: (1) Mosquitoes are among the most important arthropods that transmit disease and annoy man. Numerous species are involved, and the number is compounded by marked differences in their breeding habits, behavior, and dispersal. Consequently, control measures for mosquitoes, whether larvicides or adulticides, usually must relate to several species or to a species group to be applicable to mosquitoes in general. Experimental checks should consist of untreated areas.

(2) Insect resistance can be a major problem when testing a product for mosquito control. Other factors of special concern in determining a product's usefulness are wildlife and fish hazards, possible water or air pollution, effects on house paints and spotting of automobiles.

(3) Repellency from mosquito coils, candles and torches is dependent upon the concentrations and duration of smoke or fumes which permeate a limited area. The test results on products of this type should demonstrate repellency of mosquitoes and other small flying insects on patios, porches or other confined outdoor areas where there is little or no breeze. Testing for human and animal disease prevention or control is possible only in well coordinated, large-scale area programs, such as those conducted by public health agencies.

(j) Human and pet treatments. Insecticides of this type may be applied as sprays, dusts, lotions, towels, ointments, creams, sticks, flea collars, flea tags, soaps and shampoos. Insect repellency tests should demonstrate minimal contact between the insect and the test chemical. Reports must distinguish between killing and repelling effects, since repellent insecticides may preclude any lethal effects. Because breed, age, size and hair length influence the usefulness of insecticides applied to dogs and cats, all these factors should be evaluated in testing pet treatments.

(k) Premise treatments.

(1) *Household insecticides.* In general the presently adopted and tentative official test methods of the Chemical Specialties Manufacturers Association (CSMA) are followed in testing house-

hold insecticides. These methods are The Peet-Grady Method; The Aerosol and Pressurized Space Spray Insecticide Test Method for Flying Insects; Cockroach Spray Method; Cockroach Aerosol Test Method; Textile Resistance Test; and The Determination of Plant Safety of Pressurized Formulation for Use on Plants in the House or Garden. (See Appendix Part IV. E.)

Test data must be submitted to verify that there is no staining of other adverse effects to wallpaper, paint, tile, varnish or other finished surfaces likely to be contacted by the product, when applied according to label directions for use.

(2) *Commercial and industrial insecticides.* These formulations may be in liquid or pressurized form for spray treatments and in paste, powdered or granular form for bait treatments. So-called crack and crevice spray applications should effectively control the target pest and destroy isolated populations without exceeding a maximum coverage of 20 percent of the floor and lower wall surfaces, including shelving and cabinets. Commercial and industrial insecticides are generally tested in the same manner as household insecticides, but it is important to be extremely cautious or, if possible, avoid their use in or around food or food processing areas.

(3) *Food handling establishments.* (i) A food handling establishment is any place, other than a private residence, in which food is held, processed, prepared and/or served. Food areas include those used for receiving, serving, storing (dry, cold, frozen, raw), packaging (canning, bottling, wrapping, boxing) and preparing (cleaning, slicing, cooking, grinding) food; for edible waste storage; and for enclosed processing systems (mills, dairies, edible oil extractors and evaporators). Non-food areas include garbage rooms, lavatories, floor drains (to sewers), entries and vestibules, offices, locker rooms, machine rooms, boilers roms, garages, mop closets and storage (after packaging).

(ii) Any registration for uses in food handling establishments will require associated food additive tolerance regulations as stipulated in Section 409 of the Federal Food, Drug, and Cosmetic Act.

(4) *Agricultural insecticides.* (i) Insecticides to be tested in or around dairy barns, horse barns, stables, poultry houses and yards, and other agricultural structures may be applied as sprays, dusts or baits to stanchions, walls, floors, manure, bedding, and other areas where the target insects may rest or breed.

(ii) To control flies in agricultural structures, residual sprays should be applied to wet all resting places to the point of runoff. Outside areas where flies gather, such as corrals and paddocks, should be sprayed thoroughly.

(iii) If insecticides are to be tested as space sprays, fogs or vapors in dairy barns, horse barns, shelter sheds, milk sheds, or other agricultural structures, animals should be removed and air circulation should be reduced as much as possible by closing doors, windows and other openings.

(iv) Insecticide baits may be tested as cakes, cones, syrups and liquid or dry formulations in agricultural structures and in outdoor areas. Liquid and dry baits should be applied as a certain weight or volume per specified area of floor or ground. Cake or cone products should be placed or hung in areas frequented by the target pests.

(v) Products intended to be used in poultry houses and yards are generally tested as sprays or baits on manure, window sills, outside surfaces of penned enclosures and on the floor of feed and storage rooms. They must be applied in a manner that precludes illegal residues in feed or drinking water.

(l) Structures. (1) Insecticide treatments include wood preservatives and termite soil poisons. Both subterranean and dry-wood termites cause major property damage particularly across southern areas of the United States. Tests on the effectiveness of wood preservatives and soil poisons as termite treatments must be carried out over a minimum of 6 yr under actual use conditions to be meaningful and acceptable; no reliable accelerated testing procedures exist at this time. Soil treatments require that special care be exercised to assure that water supplies are not contaminated with the chemical and that the treatment causes no intolerable injury to foundation plantings of shrubs and other ornamental plants.

(2) Tests for use of wood preservatives to control powder post beetles, old house borers, carpenter ants and certain other wood-destroying insects may follow conventional test method procedures.

(3) Testing by professional individuals or agencies can sometimes be arranged to gather data in the latter stages of development of many of these products.

(m) *Stored products.* (1) Commodities to be protected include grain, cereals and other dry foods, tobacco, woolen and feather goods, furs and furniture stored in such places as grain elevators, boxcars, ship's holds and warehouses. The evaluation of insecticides here is usually based on a high percentage reduction in the various insects after treatment and on assessment of any possible adverse effects on the grade or quality of the treated commodity. In certain cases—with furs, woolen and feather goods—complete protection is essential. In all cases where food or feed commodities are involved, tests must be conducted on palatability. If seeds are involved, data on germination or viability must be provided.

(2) Space sprays and residual treatments should be tested in such a manner or in locations which minimize the contamination of stored feed, food or tobacco.

(3) Fumigants release toxic vapors and should be tested only after man, beneficial animals or birds have been evacuated from the premises. Fumigated premises should be thoroughly ventilated before reentry.

(n) *Fabrics.* (1) Tests of products to be used against fabric pests, such as clothes moths and carpet beetles, must demonstrate complete control of the insects.

(2) Temporary moth treatments are nonresidual sprays which kill by contact action and which require repeated applications. Semipermanent mothproofers are residual chemicals applied to wool, fur, or hair rugs, garments and blankets as coarse sprays or, in some cases, in drycleaning solutions. To test semipermanent mothproofing sprays, the articles should be sprayed lightly but uniformly until the surfaces are moist, but never soaked or saturated. Dry the sprayed articles thoroughly before testing.

(3) Permanent mothproofers are impregnated in the fabric during the dye process and should remain effective throughout the life of the fabric. Permanent formulations should be tested before and after repeated washing or drycleaning. (For mothproofing test procedures, see Appendix Part IV.E.)

§ 162.70 Specific considerations: Vertebrate Control Agents.

(a) Vertebrate pesticides are defined as any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any vertebrate animal which the Administrator declares to be a pest. Vertebrate include all wild and domestic mammals (except man), birds, amphibians and reptiles. (For fish, see Specific Considerations: Aquatic Pest Control Agents.)

(b) Vertebrate pesticides include lethal agents; irritants; repellants based on odor, taste, postingestional psychophysiological reaction or pharmacological reaction; repellants based on mechanical action such as tackiness or stringiness; anesthetizing chemicals, reproductive inhibitors; and fumigants.

(c) The outline at the end of this section summarizes the basic information needed to evaluate efficacy of vertebrate pesticides. Additional data may be required where conditions, such as pattern and location of use, claims made or implied, method of application, species and subspecies differences, indicate the data are insufficient to answer specific questions. For the total data requirements for any substance or mixture of substances submitted for registration as a pesticide, review Chemistry and Hazard Evaluation. Some interpretative comment on test data and test design parameters follows.

(d) Test data. (1) The albino laboratory rat and mouse are recognized as invaluable in screening and studying vertebrate pesticides; nevertheless, acceptable evidence of efficacy of new compounds and new uses must, in the final stages of the study, include the exact animal species for which control claims are made in the labeling. There are several examples wherein members of closely related groups exhibit markedly different susceptibility to the same compound. Alpha-naphthyl-thiourea (ANTU), for example, has a LD-50 of 8 mg/kg for the brown rat and a LD-50 of 220 mg/kg for the roof rat. The differences in susceptibility need not be of this magnitude, however, to affect label claims. The well-known anticoagulants, as an example here, may require 10 or more days feeding to control a brown rat (Rattus norvegicus) population, but the same formulated bait may require 15 or more days to achieve comparable control with house mice (Mus musculus).

(2) In most cases, acceptable data on the species claimed must also cover both sexes and both young and old animals, to determine the influence of age and sex on susceptibility to the proposed product.

(3) Although data on lethal dosage are very important, species' physiological differences, food preferences, and feeding habits may play an even more important role in a product's efficacy. Bird feeding habits, for example, are largely governed by sight and tactile perception. Even small changes in customary size, shape, texture or color of food can be enough to reduce the initial rate of bait acceptance.

(4) Results of tests, in which a chemical is administered forcibly (by intubation) or by *ad libitum* feeding, and no alternative untreated foods are available, are useful as pharmacological data and as guides in formulating finished baits. Such tests should be supplemented by free-choice bait acceptance studies since wild vertebrate populations nearly always have a free food choice. Treated and untreated portions of the same food may be used to determine acceptable levels of toxicant in the bait. Tests to determine the acceptability of a formulated bait should be compared to a standard placebo diet, where such a standard has been established. Statements regarding the palatability of ready-prepared baits must be supported with appropriate bait acceptance studies using the target species.

(5) When vertebrate pesticides are to be applied to plants or seeds, data must be submitted showing that the proposed formulation does not produce phytotoxicity or significantly reduce seed viability. Such studies should be conducted on representative plant or seed species and should reflect the effects of application on plant growth or seed development through a growing cycle. The data must also reflect effects of repeat applications where such applications are recommended.

(6) If vertebrate pesticides are to be applied to food or feed crops, the establishment of finite tolerances, or exemptions from the requirements for tolerances, may be necessary.

(e) *Test design:* (1) Study teams should include personnel who are thoroughly familiar with the life habits and behavior of the target species. This is particularly important when the goal is repellency and the criterion for evaluation is a change in an established behavior pattern. For example, if an attempt is made to rid an airport of gulls with a chemical repellent used just before they would habitually migrate to northern nesting grounds, the result is questionable.

(2) When designing efficacy tests for use under cage or captive conditions, corroborative methods of field application should be kept in mind. For example, if an area repellent is intended to keep dogs off a lawn or a garden by treating the perimeter, then merely demonstrating that a dog will avoid a familiar object when treated with the product is not applicable proof of area repellency. Similarly, a so-called repellent that appears to have value in stopping the use of a urine scent-post may have little value in stopping some other objectionable behavior.

(3) Research and development of vertebrate pesticides should always include tests conducted under actual field conditions. The interrelationship between inter- and intraspecies behavioral patterns and the impact of environmental factors are so complex that cage tests alone cannot suffice.

(4) If a claim is made that a product is effective for a particular time period, then the test design must reflect studies covering that period of time. For example, several bird repellents that rely on the continued tack-and-string of a bead of gel that has been applied to a roost, claim effectiveness for one year. The registrant is responsible for tests to verify that the gel does not crust or otherwise lose its effectiveness for a full year under different climatic and physical conditions. Similarly, claims that an indoor pet repellent does not stain upholstery or that a rodent population can be satisfactorily controlled in 10 or more days must be supported by appropriate test data.

(5) The outline is grouped by type of study (laboratory studies, preliminary field studies, and advanced field studies). The laboratory studies should provide the preliminary data to indicate efficacy of a potential product or use. Preliminary field studies should indicate the product's potential in terms of effect on small areas or populations, dosage ranges under field conditions, and individual and group animal reactions to a treatment. Advanced field studies should show, on a regional basis, the efficacy of the product under a variety of use conditions, environmental factors, etc. (The number of regional studies required vary, depending upon the species claimed and their normal range, the claims made in the labeling, etc. Therefore, no statement can be made to cover all situations which will be encountered.)

I. Laboratory studies (preliminary efficacy studies)

A. Physical-chemical properties of active ingredient(s)

B. Acute and subacute toxicity studies using target species (The exact toxicoligical studies required will depend upon the mode of action of the chemical(s), the method of application and the claims.)

C. Effect of each active ingredient

D. Physiological or behavioral effect of product

E. Dose response to the product

F. Rate and duration of response and/or physiological effects

G. Cage test—single and multiple animal studies using target species (Cage studies for repellents will vary with the intended action of the chemical and the behavior to be modified. Because of the many variables involved in testing repellents, it is advisable to submit the proposed test protocol for review before implementation.)

1. Food preference studies
2. Product acceptance and reacceptance
3. Effect of product age on acceptance
4. Effects of stickers, spreaders, diluents, etc.
5. Specificity to target species and/or sex
6. Effects of age on susceptibility
7. Activity cycle effect on animal susceptibility
8. Special claims
9. Effect of method of application on response (where applicable)
10. Phytotoxicity (where applicable)

H. Product stability (shelf life)

II. Field studies

A. Preliminary field studies

1. Test and control areas required
2. Pre- and post-treatment population census and census technique
3. Rate, duration and significance of response
4. Effect of environmental factors (climatic and physical) and managerial practices

B. Advanced field studies (Experimental Permit may be required.)

1. Regional testing required
2. Pre- and post-treatment population census and census technique
3. Rate, duration and significance of response
4. Effects of environmental factors (climatic and physical) and managerial practices

LABEL DEVELOPMENT

§ 162.71 General comments.

(a) The information discussed as general comments is basic to all pesticide products. The specific comments on types of products (for example, aquatic pest control agents, fungicides, etc.) provide only additional detailed information related to a particular type of product. Labeling requirements are specified in § 162.10.

(b) Claims. (1) Claims for the use of a pesticide product relate to the pest or pests to be controlled and, sometimes, to the mode of action of the product. Claims are derived from the data obtained in performance testing and modified, as necessary, by the usefulness data, the information developed on the product's chemistry and its hazard evaluation. The modification process results in (i) directions for use; (ii) limitations of use; and (iii) appropriate caution statements. Each claim must be clearly defined, must reflect the data and must not extend beyond the demonstrated value of the product. Such claims as eliminate, eradicate, exterminate, free and rid, and any claim that the product is safe are too broad and promising and are unacceptable.

(2) Claims Subject to Regulation Under FIFRA, as Amended: Whether a product is intended for use as packaged or after dilution or mixture with other substances, such as water, kerosene, talc, clay, fertilizers, baits, or other carriers, solvents, diluents, or propellants, it will be considered a pesticide if:

(i) Claims or recommendations for use as a pesticide are made on the label or labeling of the product.

(ii) Claims or recommendations for use as a pesticide are made in collateral advertising, such as publications or advertising literature which does not accompany the product, or radio or TV advertisements.

(iii) Claims or recommendations for use as a pesticide are made verbally or in writing by representatives of the manufacturer, shipper, or distributor of the product.

(iv) The product is intended for use as a pesticide after reformulation or repackaging.

(v) The product is intended for use both as a pesticide and for other purposes. (Such a product is subject to all provisions of the Act, including section 2(q)(1)(A) under which a product is misbranded if its labeling bears any statement that is false or misleading concerning any pesticidal or nonpesticidal use.)

(3) Claims subject to regulation under other acts: (i) Whenever application is made to EPA for registration of a product that is both a drug and pesticide, and the determination is made that the principal claims or representations relate to pesticides, EPA will withold registration of the product until the Food and Drug Administration confirms that the product complies with the provisions of the laws administered by that agency.

(ii) Whenever application is made to EPA for the registration of a product that is both a drug and a pesticide, and the determination is made that the principal claims or representations relate to a drug, EPA will refer the application to FDA for processing.

(iii) Neither agency will approve the marketing of a product under the law administered by that agency if the product does not comply fully with the requirements of the law administered by the other agency.

(iv) Although the claim for use in federally inspected meat, rabbit, poultry and egg processing plants will be accepted on labeling, registrants must obtain clearance for such use of their products from:

U.S. Department of Agriculture, Meat and Poultry Inspection Program, Animal and Plant Health Inspection Service, Washington, D.C. 20250.

or

U.S. Department of Agriculture, Egg Products Inspection Programs, Agricultural Marketing Service, Washington, D.C. 20250.

(4) Claims for manufacturing use only: (i) This phrase is permitted on the product label provided it is qualified by wording on the front panel which identifies the type of manufacturing use (that is, formulation of other pesticides, repackaging use, or incorporation into other manufactured products as preservatives or protectants against pests); and type of pesticide involved (fungicide, herbicide, insecticide, disinfectant, etc.). For example:

(A) For manufacturing use only in formulating fungicides and bactericides.

(B) For manufacturing use—for repackaging as insecticides.

(C) For manufacturing use—as a bacterial and fungal preservative for coatings and adhesives.

(ii) The guidelines enumerated below are intended to clarify registration requirements.

(A) Pesticides intended for formulation of other pesticidal products.

(*1*) Labels for products in this category should bear the identifying phrase, For Formulation of (Insecticides, Fungicides, Disinfectants, etc. * * *), on the front panel. This phrase would normally apply to an unformulated pesticide intended to be processed into another pesticide product by, for example, encapsulation, incorporation into or onto granules, addition of adjuvants, or by simple dilution.

(*2*) The label or a technical bulletin to which the label refers must provide adequate information concerning the physical and chemical properties of the chemical that are pertinent to the needs of formulators. This requirement may be waived when, as in the case of a common, well-known pesticide, such information is generally available.

(*3*) Proof of safety and utility as a pesticide may be waived in the case of well-known pesticides. In other cases, the registrant of formulating-use-only products has 2 options:

(*i*) Submit proof of effectiveness as to the type of pesticide(s) named, based only on presumptive laboratory data. In this case the registrant must include a statement on the labeling notifying formulators that they will be responsible for providing supporting data for their formulations; or

(*ii*) Submit XYZ or John Doe labels for various formulations together with confirmative data on the results of safety and efficacy tests for each product formulation. The statement in item 1 above notifying formulators is not required.

(B) Pesticides intended for repackaging. These products would not require further processing or formulation. The front panel of the label should bear the phrase, For Repackaging of a (Fungicide, Herbicide, Rodenticide, etc. * * *), and refer to a technical bulletin. This bulletin should include: Specimen labeling giving adequate directions for use based on a registered label of identical formulation; reference to laboratory and in-use efficacy and toxicity data which have been submitted in support of the above registered label; reference to the requirement that any new uses or any further reformulation of the product may require additional supportive laboratory and/or efficacy and safety data; and reference to the requirement that data may be necessary if any modification of a pesticide product, such as simple dilution, addition of dyes or perfumes, nozzle designs, or any other change that could affect the hazard or performance of the product, is involved. In lieu of the technical bulletin, the preceding information must appear on the label itself.

(C) Pesticides intended for use in items that are not pesticides. Products in this category should bear the label claim, For Use as a (Fungicide, Bactericide, Bacteriostat, etc. * * *) in (Coatings, Fabrics, Building Materials, etc. * * *). The products should be recognized preservatives for items or materials that are not themselves identified as pesticides. A technical bulletin should provide: Information on pertinent physical and chemical properties of the pesticide product, such as leaching, photodegradation, volatility and stability in treated items; and directions for use, including a general description of the intended purpose of treatment, method(s) of application, dosage and relative safety to the environment. Detailed directions for use may be omitted from the label provided that: Such a technical bulletin is provided; the pesticide will not come into the hands of the general public except after incorporation into finished products; and in the opinion of the Administrator, such directions are not necessary to protect the general public.

(D) Pesticides intended for use in 2 or more categories. These products must satisfy the labeling requirements of each intended category, stated separately on the label and in the technical bulletin or bulletins.

(E) Pesticides intended for use to control pests in, on, or around industrial sites are excluded from any of the categories listed above and must be registered with adequate directions for use given on the label or in a brochure accompanying the product.

(5) Claims as Preservatives: (i) The terms preservation, preservative, preserves, when used alone, are interpreted to be pesticide claims, and the products are subject to registration under the Act. The general fields of usefulness must be named and specific organisms may be identified; for example:

(A) Preserves wood against fungal rots and decay.

(B) For the preservation of oil-in-water emulsions. Effective against Aspergillus niger, Pseudomonas fluorescens, P. aeruginosa and Staphylococcus aureus.

(C) Preservative for leather. Effective against a wide range of bacteria and fungi.

(ii) If pesticide use is not intended, the words preservation, preservative of preserves must be modified by specifying the nonpesticidal action intended; for example:

(A) Preserves the color (shape, texture, etc.) of * * *

(B) When used as a preservative on metallic surfaces, protects against corrosion.

(iii) The terms preserves, preservation, and preservative used in conjunction with shoe polish, saddle soaps and leather conditioners to indicate benefits derived from water repellents and sealers, such as epoxy, silicone and wax formulations which do not contain active antibacterial or antifungal agents, are not considered pesticide claims.

(c) Directions for use: (1) The label directions should specify what is to be controlled, where or on what it is to be controlled, and how the product is to be applied, at what rate, when and with what frequency. For example: The names of the pests or pest groups and directions for their control should be associated with the appropriate crops or sites of application; the label should indicate if a product is for use in greenhouses and include greenhouse directions and dosage rates; and the label should indicate if a product is intended for aircraft application and contain appropriate directions for use, including the minimum amount of water or other diluent to be applied per acre.

(2) Directions should be appropriate for the size of the package on which they appear. The directions for home use should not require more of the product than is contained in the package.

(d) Limitations of use: Use limitations should be closely associated with the appropriate directions for use and crops to which they refer. Limitations on the uses of pesticides relate to directions for use and the persistence, toxicity or physical characteristics of the individual product. Certain directions for use, such as apply by aircraft or apply to aquatic sites (lakes, ponds, streams, swamps) will impose a classification restriction and limit the application of that product to certified applicators. The persistence and toxicity of a product are reflected in such limitations as: (1) The maximum dosage and time of last application before harvest of a feed or food crop consistent with an established tolerance; (2) an established regulation on field reentry by workers having intimate contact with the treated crop; and (3) the safety and legality of planting subsequent crops on treated land. Limitations imposed by the physical characteristics of a product include, as an example, restrictions on the use of butyl esters of phenoxy herbicides because of their volatility.

(e) Precautionary statements: Precautionary statements warn the public of hazards which may be encountered in handling, using, storing or disposing of a product. Hazard may be dependent on toxic or irritant properties, on availability of antidotes, or on explosive, flammability or other special characteristics. Appropriate first-aid treatments and antidotes, if available, should appear in the precautionary statements. See Packaging, Storage and Disposal for additional information.

(f) Labeling requirements for pre-measured unit packaging:

(1) Pre-measured unit packages of pesticides so marketed will be required to exhibit the following labeling on the individual unit package:

(i) Statement of active ingredient(s).

(ii) The appropriate signal word(s) as well as the skull and crossbones, if appropriate.

(iii) The EPA Registration Number.

This information must appear in 6 point type or larger. The manufacturer may, at his option, add additional information to the package when size permits, providing it does not detract from the prominence of the required information. This requirement applies to the smallest individual unit of a pesticide packaged separately which could be expected to be removed from the outer container. If a water-soluble package is enclosed in a foil or plastic package on a one-to-one basis, only one of the 2 packages will require the above labeling as either one would be the smallest individual unit which could be expected to be removed from the outer container.

(2) The outer container label for all pre-measured unit packages must bear the following statement in a prominent position: "Do not remove packages from container except for immediate use".

§ 162.72 Specific comments on antimicrobial agents.

(a) The brand name and the type of product identified on the label must be consistent with the claims made and the use directions provided. The claims made for a product must be related to the level of effectiveness (sterilizer, sporicide, disinfectant, sanitizer, bacteriostat), the microorganisms affected and the pattern of use.

(b) Self-sterilizing, self-disinfecting, actively germicidal, and self-sanitizing claims for surfaces and treated materials are frequently proposed. Claims of this type have led to a great deal of confusion and deserve special attention. The resistance of bacteria to chemicals in the absence of moisture virtually rules out the possibility of producing self-sterilizing, self-disinfecting or actively germicidal materials or surfaces. Bacteriostatic and self-sanitizing materials and surfaces may be produced as the result of treatments with chemicals; however, the practical value of such treatments must be considered as a mitigating level of activity and must not be classified as protective in preventing the spread of infectious microorganisms. The presence of moisture is required for growth of microorganisms as well as for the germicidal activity of chemicals. For this reason, chemicals that occur as a dried residue after application of a disinfectant to an inanimate surface or that exist in impregnated materials exhibit antibacterial activity in the presence of moisture but would have only minimal, if any, activity in the dry state. Obviously, such a claim as permanently germicidal for a treated surface could not be justified. In general, claims made for residual bacteriostatic and self-sanitizing activity of treated surfaces or materials are being discouraged because of the unrealistic test procedures currently available and the lack of practical usefulness and public health significance of the product in actual use.

(c) The claims germproof or germproofed, referring to any surfaces, materials or articles, indicate the existence of actively germicidal or self-disinfecting properties. Since there are no known pesticides that have been shown to provide these benefits, these claims are not permitted on the label or labeling of disinfectant products.

(d) The unqualified claims kills germs and kills bacteria may be considered by the consumer as synonymous with sterilization. Since no differentiation is made with respect to the type of germs which will be killed, the purchaser has a right to expect that the product will kill all germs and all bacteria, including the most resistant bacterial endospores. These claims are badly misused in advertising media. The claims kills most germs, kills many germs, kills most bacteria and kills many bacteria may be appropriate for many disinfectants, provided that laboratory or test data developed with both Gram-positive and Gram-negative organisms support such claims.

(e) Claims for usefulness against specific diseases and specific infectious bacteria, fungi and viruses are commonly proposed. It is considered misleading to claim that applications of any germicide or disinfectant to inanimate surfaces will be effective against any specific disease. A disease is a condition, and the words, typhoid, tuberculosis, cholera, poliomyelitis, anthrax, etc., describe specific pathological conditions. When used in labeling and advertising, they imply that the product may have value in the treatment of the specific condition or conditions named, but this is seldom, if ever, true. Claims for effectiveness against the specific causative agents of diseases, however, are acceptable, if true.

(f) In the registration of products, such superlative claims as ideal and perfect are objectionable. The word ideal denotes perfection, and it would be unfair to allow a manufacturer to portray his product at this standard of excellence. It should be deleted, or replaced with a designation such as good, especially adapted or excellent, whichever may be true.

(g) Names coined from the word sterilize, such as Steri, Steryl, etc., are considered to imply that the product is a sterilizing agent and are objectionable.

(h) Phenol Coefficients: A phenol coefficient claim constitutes a disinfectant claim. An unqualified phenol coefficient claim is interpreted to represent a value against Salmonella typhosa. Where a phenol coefficient is declared against any other bacterium, the phenol coefficient against S. typhosa also must be declared. Phenol coefficient claims are not acceptable for acid toilet bowl cleaners, halogens, alkalis, alcohols, formaldehyde and potassium permanganate.

(i) Virucides: The claim virucidal is not acceptable unless qualified according to the specific viruses or types of viruses against which the product has been tested and shown to be effective. A virucidal claim must also include the phrase on environmental surfaces.

(j) Effectiveness in hard water: (1) If claims for effectiveness in hard water are made, the label must indicate the hard water tolerances claimed: for example, Effective in waters up to ________ ppm hardness calculated as calcium carbonate; or, to meet the requirements of the U.S. Public Health Service Ordinance and Code, This product fulfills the criteria of Appendix F of the Grade A Pasteurized Milk Ordinance, 1965 Recommendations of the U.S. Public Health Service in waters up to ______ ppm of hardness calculated as calcium carbonate when tested by the AOAC Germicidal and Detergent Sanitizers—Official Method. When it is shown that the hard water values materially differ, as between S. aureus and E. coli, the lowest value must be stated. In this case, the respective hard water values may also be stated separately.

(2) Any product that bears label claims for effectiveness in hard water must be tested by the appropriate method in hard water at the tolerances claimed.

(k) Air sanitizers: (1) Glycols and glycol mixtures sold to temporarily reduce the number of microorganisms in the air are subject to the provisions of the FIFRA, as amended. With glycols and glycol mixtures sold for the use in continuous vaporizing devices, the vaporizer itself need not be registered; however, since its use is stipulated as an integral part of the directions for use of a specific pesticide, the labeling used in connection with the sale of the vaporizer is collateral to the labeling of the pesticide and must be submitted as a part of the registration. Label directions must stipulate that all doors and windows be closed, the length of time the product should be released into the air and the appropriate percentage relative humidity necessary for the product to be effective.

(2) Adequate experimental data is available to show that, irrespective of the method of dissemination, air sanitizers will not sterilize, disinfect, act as a germicide, or protect experimental animals from infection by airborne bacteria and viruses. They will be accepted for registration when the claims are made in such a manner as to clearly indicate the mitigating nature of the activity of glycol vapors continuously dispensed and when adequate directions for the maintenance of effective atmospheric conditions and vapor concentrations are furnished.

(3) With dispensers for the intermittent treatment of air, such as aerosols, no appreciable amount of scientific data exists in the literature to indicate that products of this type have any practical value, except under specific situations, because of the rapid rate of disappearance of glycol vapor from the air.

(4) Claims like the following are unacceptable for air sanitizers: Kills Cold and Flu Germs in Midair; Destroys Microbes that Spread Measles, Mumps, Pneumonia, Strep Throat, Colds, Flu; Protects Homes, Offices Against Infectious Diseases; Gives Protection to Office Workers; Effective Cold Treatment; Germ Killing; Air Disinfection; Prevents the Spread of Acute Respiratory Infections; Sterilizes Air; Purifies Air; Germicidal Vapors; Bactericidal Vapors.

(5) The phrases Fresh Air, Refresh the Air, Air Freshener, Provides Fresh Air are objectionable in that use of these products cannot be considered as an efficient substitute for adequate ventilation in closed spaces, and such products do not provide fresh air. Qualified terms such as Provides Refreshing Fragrance would be acceptable. The term fresh when used with the word air requires a prefix and a suffix (refreshner) to avoid connotations of providing fresh air.

(6) The label of products concurrently represented as surface disinfectants and air sanitizers must clearly delineate and separate the claims and directions for surface disinfectants from those of air sanitizers.

(7) Fogging applications of disinfectants cannot be accepted to disinfect air or room surfaces. Thus, such label representations as germicidal fogging, decontamination and disinfectant fogging are not acceptable. Recommendations for fogging applications of chemicals to sanitize surfaces may be accepted when directions specify that this use is an adjunct to accepted methods of manual cleaning and disinfecting.

(l) Antimicrobial Fumigrants. (1) Either disinfection or sterilization may be accomplished under certain conditions by the use of gases or vapors. The chemicals most commonly used are formaldehyde and ethylene oxide. Complete directions for use must be provided to stipulate the amount of gas or vapor necessary, the cubic feet of closed space to be treated and the exposure time required to accomplish the intended end result.

(2) Sterilizing processes using ethylene oxide require a pretreatment to rehydrate dry spores which may be present.

(3) If pretreatment, relative humidity, temperature or other factors are essential to the effective use of any of these chemicals, requirements must be clearly specified on the label.

(m) Laundry additives. (1) A clear distinction should be made between products recommended for household laundering and products represented as commercial laundry additives. Directions for household laundering products may require different dosages for front-loading or top-loading automatics and/or wringer-type washers. Product dosages in this instance must be stipulated as household measures. The fabric-to-water ratio in home laundering is about 1:10, whereas in commercial laundering the ratio is 1:5. The effectiveness of certain products is significantly altered because of these differences; thus, demonstrated efficacy in one system cannot be extrapolated to the other.

(2) Dosage directions for use in commercial laundering may be based on pounds of dry cloth. To determine the aqueous concentration of the product, each pound of dry cloth is converted to 5 lb of water. The use of sours or acid salts or fluorine and/or acetic acid with acetates in the final rinse requires determination of efficacy with the sour present in test solutions.

(3) Label claims must be keyed to the actual levels of activity that have been tested and substantiated, and where bacteriostatic and/or sanitizing/disinfecting claims are concurrently made, the label text and directions must clearly delineate and separate the respective levels of activity. Claims for residual self-sanitizing activity on treated fabrics must be related to the presence of moisture; for example, imparts a self-sanitizing residual on treated fabric, active in the presence of moisture would be acceptable.

(n) Toilet bowl and urinal disinfectants and sanitizers: (1) Claims for disinfecting the hidden trap and claims for solutions in the flush tank to disinfect the bowl each time the toilet is flushed are unacceptable. Drip feeder systems, liquid chemicals and deodorizing blocks are not accepted as disinfectants or sanitizers for such fixtures, although there is no objection to deodorizing claims for such chemicals. Where it is demonstrated that a practical level of bacteriostatic odor-controlling activity can be maintained in the water reservoir or traps, such claims may be acceptable.

(2) If directions for use of the product specify, Force the bowl water over the trap, liquid concentrates recommended for direct application to the bowl can be accepted for disinfecting, *Provided*, That additional directions specify swabbing all surfaces thoroughly. The product may be tested, undiluted, against *Salmonella chloraesuis* by the AOAC Use-Dilution Method.

(3) When residual water is present in the bowl (approximately 96 fl. oz), a concentration high enough to kill S. choleraesuis in the AOAC Use-Dilution Method must be specified with additional directions for swabbing all bowl surfaces.

(4) The directions for use of toilet bowl sanitizers must also specify swabbing all surfaces thoroughly and may be tested in a manner similar to disinfectants by the appropriate surface sanitizer test.

(o) Chemical toilets: Lye, coal tar emulsions, cresylic acid-soap, phenolic-soap, phenolic salts, orthodichlorobenzene and quaternary ammonium compounds have been registered for use in chemical toilets. No claims for disinfection of the excreta itself are acceptable. The products may, however, be identified as disinfectants. If such identification is made, the directions for use must include instructions which will adequately disinfect the container. Claims related to human wastes must be restricted as, for example, to aid in the sanitary disposal of human waste.

(p) Dust mop and cloth treatment compounds: Claims of effectiveness must be restricted to bacteriostatic action on the treated mop or cloth, and the label text must clearly distinguish between the bacteriostatic activity and dust retention. Directions for use must be sufficient to yield a finished mop or cloth that can be shown to the bacteriostatic by test and efficacious as a vehicle for gathering and holding dust particles.

(q) Mattresses and upholstered furniture: Fumigation or gaseous sterilization is the only effective and practical means to sanitize, disinfect or sterilize pillows, mattresses, upholstered furniture or similar dense objects. Disinfectants are not effective for these uses and claims for such products are unacceptable. Some components of furniture, however, such as fabrics, leather, plastics, burlap and ticking, can be effectively treated to resist microbial deterioration before fabrication into furniture. For additional information, see the discussion on material preservation.

(r) Bird cage and animal litters: In controlling odors in animal rooms, in bird houses in zoological parks, in bird cages and in pet litter boxes in the home, it has become common practice to treat the litter with chemicals to prevent the growth of odor-producing bacteria. Products with claims for odor control only can be registered on the basis of valid, simulated in-use data submitted by manufacturers.

(s) Household and institutional (nonmedical): An unqualified representation that a product is intended for use in institutions is too broad in that it may include or imply use in medical as well as nonmedical institutions. The requirements to substantiate efficacy will be applied on the basis of medical use where the unqualified word institutional appears on the labeling.

(t) Hospital and related institutions: (1) A hospital disinfectant must be tested against *Pseudomonas aeruginosa*. If it is not effective against this test organism, the product still may be accepted for registration bearing hospital, medical, dental, clinical and veterinary representations. However, in this case, the label must bear a prominent disclaimer to the effect that the product is not effective against *Pseudomonas* species. The label disclaimer may be replaced by special directions needed to assure efficacy against this organism if certain concentrations or applications in a special manner are required.

(2) No activity short of disinfection is considered to have practical significance in critical medical areas, such as infectious wards, isolation areas, operating rooms and intensive care units. Products not identified as disinfectants and recommended for use in hospitals must be restricted to use in noncritical hospital areas and must bear a disclaimer such as, This product is not a terminal disinfectant and must not be relied upon as a disinfectant for critical hospital areas.

(3) When products are sold or recommended for use in the disinfection of surgical instruments, directions for use must include instructions for cleaning all instruments to remove adhering blood, pus and serous exudates before immersion in the solution recommended. This is critical for hinged instruments or other devices containing small orifices, tubes or seams.

(4) Oral and inhalation equipment used in hospitals and related institutions are reported, with increasing frequency, to be vehicles for disease transmission. The moist environment in components of the equipment tends to maintain the viability of microorganisms that are deposited there following use by the patient. If a product is recommended for disinfection of such equipment, it should be effective against *P. aeruginosa* and *Mycobacterium tuberculosis* as well as *S. aureus*; efficacy against bacterial spores may be required in the future. Because of the serious nature of this problem, whenever practicable, such equipment should be disassembled, precleaned and sterilized, and label directions should include this recommendation.

(5) Claims for disinfection of human wastes are unacceptable, although disinfectants may be recommended to aid in the sanitary disposal of such wastes and to disinfect the containers themselves after cleaning.

(6) Deodorants used in the hospital environment are generally products that simply mask the odors associated with patients suffering from incontinence, draining wounds, severe burns, etc., and are not practical in controlling or inhibiting microbial growth. However, some bacterio-static deodorants have been accepted for hospital use where claims of value are clearly defined. Care must be exercised to avoid confusion of deodorizing activity with disinfection.

(u) Barber shops and beauty parlors: (1) Adequate cleaning and disinfection of instruments and equipment between customers should be recommended on the label. Products manufactured for these uses include bacteriostats, sanitizers, and disinfectants.

(2) Use of such products is usually controlled by local ordinance. The requirements are far from being uniform, and much of the wording employed is inconsistent with any reasonable law enforcement program. Sterilizing requirements are almost always confused with sanitizing and disinfecting processes. Thus, it is impossible to draw up a registration policy that will meet all of these health requirements and not conflict with certain specifications.

(3) The basic policy employed is that a disinfectant for this use should be effective against both enteric and pyogenic bacteria. If fungicidal claims are made in the labeling, the product must be effective against pertinent pathogenic fungi as well as bacteria.

(4) Difficulties have been enecountered with anhydrous lubricants for clippers. No disinfecting claims have been accepted for such products, although representations as *bacteriostatic cleaning oils* have been accepted.

(v) Funeral homes, mortuaries and morgues: Various products, such as deodorizers, sanitizers and disinfectants representing a rather wide variety of special chemicals, are used in these establishments. Products that are represented solely for embalming bodies and that make no pesticidal claims are exempted from the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. However, products sold for use on instruments, equipment, furnishings, preparation and autopsy rooms and associated vehicles are subject to the Act and must be registered. Exorbitant claims for protection of personnel are unacceptable for these products.

(w) Restaurants, Taverns, etc.: (1) Various disinfectants, germicides, sanitizers and detergent-sanitizers are recommended for use on cooking utensils, dishes and glasses in restaurants, taverns, bars, lunch counters and other establishments where food or beverages are served. Some of the products serve as germicidal rinses for previously cleaned dairy and food processing equipment as well as for dishes and glasses in restaurants.

(2) The basic requirements for such products, except for those used on interstate carriers, are stipulated in various local Public Health Ordinances which vary widely as to detail. The U.S. Public Health Service has provided a Model Ordinance and Code which makes certain recommendations in this field. Many local ordinances, however, differ in their specifications from this Code. Thus, the general policy has been to develop labeling requirements based on modified claims, so that all products for which there is specific public health demand in some locality can be legally transported in interstate commerce.

(3) Emphasis is directed toward the differentiation between sanitizing and disinfecting reflected in the definitions employed. Although the most desirable type of directions for sanitizing or disinfecting should specify washing, rinsing in water and rinsing in the chemical solution, directions specifying two-stage processes are accepted; that is, washing and only rinsing in the chemical solution.

(x) Farm uses. (1) Products which are recommended for use on farm premises are divided into 2 major categories, food and nonfood, as determined by the intended use and the claims which appear on the label. The guidelines for registering farm-use items which fall into the nonfood-use category are the same as those applicable to general household and institutional (nonmedical) uses.

(2) Whenever the recommended uses of a product are such that residues of the chemical are likely to contaminate animals which may be a source of food, feeds for such animals, or food products derived from animals, the product is identified as a food-use item. These products must be cleared through the Food and Drug Administration. If the applicant cannot submit evidence that his product has been cleared for the food uses shown on the label, the product will not be registered under the proposed label. The applicant may desire to revise his proposed label so that the product can be identified as a nonfood-use item. This is generally accomplished by specifically directing the user to take appropriate steps to avoid any contact of the product with food animals, feed and water, feeding and watering devices and containers which might be used for the byproducts of animals as a source of food. Removing animals from premises before disinfection of surfaces and thorough rinsing, after treatment, of watering and feeding devices is usually adequate to place the product in the nonfood-use category. For example, the following precautions are required for nonfood-use farm premise disinfectants containing cresylic acid or synthetic phenols:

(i) Do not use in milking stalls, milking parlors or milk houses.

(ii) Remove all animals and feeds from premises, cars, boats, trucks and other equipment.

(iii) Remove all litter and manure from floors, walls and surfaces of barns, pens, stalls, chutes and other facilities and fixtures occupied or traversed by animals.

(iv) Empty all troughs, racks and other feeding and watering appliances.

(v) Saturate all surfaces with accepted disinfecting solution.

(vi) Immerse all halters, ropes and other types of equipment used in handling and restraining animals as well as forks, shovels and scrapers.

(vii) Ventilate buildings, cars, boats and other closed spaces. Do not house livestock or employ equipment until treatment has been absorbed, set or dried.

(viii) Thoroughly scrub all treated feed racks, mangers, troughs, automatic feeders, fountains and waterers with detergents and rinse with potable water before reuse.

(3) The following special label directions are required for poultry house disinfectants to permit their classification as nonfood-use products. These directions must appear on labeling of products containing cresylic acid, synthetic phenols, pine oils or quaternary ammonium compounds.

(i) Remove all poultry and feeds from premises, trucks, coops and crates.

(ii) Remove all litter and droppings from floors, walls and surfaces of facilities occupied or traversed by poultry.

(iii) Empty all troughs, racks and other feeding and watering appliances.

(iv) Saturate surfaces with recommended solution.

(v) Ventilate buildings, coops and other closed spaces. Do not house poultry or employ equipment until treatment has been absorbed, set or dried.

(vi) Thoroughly scrub treated feed racks, mangers, troughs, automatic feeders, fountains and waterers with detergents and rinse with potable water before reuse.

(4) The Food, Drug, and Cosmetic Act authorizes the setting of tolerances for residues of pesticides which may legally remain in or on food or feed. The procedure for establishing tolerances through the Registration Division of the Environmental Protection Agency is given in detail in Petitions for Tolerances.

(5) Flank and udder washes and teat dips: (i) Products which are recommended solely for use as antibacterial agents on the living body of man or animals are not subject to the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. They may, however, be subject to regulation by the Food and Drug Administration.

(ii) Many pesticides which are recommended for use on inanimate surfaces on dairy farms bear additional label directions for use as teat dips and flank and udder washes for dairy cattle and farrowing sows. The acceptance for registration of labeling of any pesticide recommended for use on living animals as an antibacterial treatment will be contingent upon clearances for these uses by the Food and Drug Administration.

(6) Egg washing and sanitizing. Products recommended for cleaning and sanitizing eggs are divided into 2 categories: Those used on eggs for human consumption and those used on hatching eggs only. Applications on eggs for human consumption are identified as food additives and clearance must be obtained from the Registration Division, EPA. Products recommended for use on hatching eggs are not identified as food additives. Claims of effectiveness from egg washing and/or egg dips generally are restricted to the benefit (reduction of bacteria) derived during the treatment period. Any additional claims for residual control activity and/or improved hatchability compared to untreated eggs must be supported with reliable test data. (See also Antimicrobial Agents, Sanitizing Rinses.)

(y) Processing and industrial uses: (1) *Dairy, Food and Beverage Plants.* (i) The basic requirements for products in this category are based on the Grade "A" Pasteurized Milk Ordinance recommended code of the U.S. Public Health Service as set forth in Public Health Service Publication No. 229. This publication is available from the Government Printing Office. Products proposed as sanitizers for aplication in or on surfaces or articles coming in contact with food in dairies, bakeries, breweries, canneries, meat packing houses, slaughter houses, poultry processing plants or any other food-processing industry require essentially the same efficacy tests and label directions for use.

(ii) In dairy sanitizer applications, local ordinances differ in their specifications from the USPHS Model Ordinance and Code. Thus, modified claims and recommendations specific for a particular locality may be acceptable on proposed labels.

(iii) In general, products in this category require a clear differentiation in the label text between disinfecting and sanitizing. The directions must stipulate thorough precleaning with soap or detergent, rinsing, followed by immersion, flooding or spraying with the terminal sanitizing treatment. Where disinfecting claims are made, separate directions must be provided that stipulate modes of application and the product concentration that would assure disinfection. In registering iodophors, label references to concentrations of iodine must be expressed as titratable iodine.

(iv) Sanitizers applied to food contact surfaces are defined as incidental food additives under the Federal Food, Drug, and Cosmetic Act and require establishment of a food additive tolerance. A list of chemical agents for which such tolerances have been established may be obtained from:

Commissioner for Compliance
Food and Drug Administration
Department of Health, Education, and Welfare
Washington, D.C. 20201

(v) Products recommended for use in meat, poultry and rabbit processing plants may also require authorization for use in federally inspected establishments. Applications should be sent to the following address:

U.S. Department of Agriculture
Meat and Poultry Inspection Program
Animal and Plant Health Inspection Service
Washington, D.C. 20250

(vi) Applications for products recommended for use in egg-processing plants should be sent to:

U.S. Department of Agriculture
Egg Products Inspection Programs
Agricultural Marketing Service
Washington, D.C. 20250

(vii) Acceptance of a product for use in officially inspected plants does not convey with it a license to claim or imply approval or endorsement by any Federal agency. A label representation, such as authorized by USDA for use in ________, with the naming of the types of establishment(s) or plant(s) for which the product has been authorized, can be accepted.

(2) *Preservatives for raw foods or feeds.* Products intended for use on or in processed foods or beverages are not subject to FIFRA, as amended, and do not require registration. Products proposed for use on raw agricultural commodities as preservatives must confer a mitigating or growth inhibiting level of antimicrobial activity when applied directly to such foods or feeds. No claims for sanitizing or disinfecting can be considered. The main intent of use is to control mold growth; however, in certain instances control of bacteria may also be intended. The applicant should carefully consider the primary intent of use and make label claims accordingly. If the chemical agent proposed is a known food preservative, such as sorbic acid, potassium sorbate, propionic acid, sodium propionate, sodium benzoate or an acceptable antibiotic, no test data to substantiate claims are required. Where the proposed product contains a new chemical, test data must be submitted in representative seeded food or feed substrates to show inhibitory growth activity against pertinent microorganisms. The product must have a food additive tolerance or an exemption from a tolerance from the Environmental Protection Agency. In all cases, minimal directions for use must be furnished on the product label or in collateral labeling.

(3) *Material preservatives, bacteriostats and self-sanitizers.* This category includes products bearing claims of value in preserving an article or material from bacterial degradation. The chemical agent used in the article or material is defined as a pesticide, but the treated material is not. However, treated articles or materials that bear or imply antimicrobial claims of effectiveness outside of the material itself are pesticides subject to all provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. These distinctions are not well understood and as a consequence unwarranted claims of effectiveness for many products have been made. Chemical preservatives impregnated in certain materials, for example, have been found to leach out of the treated materials and lose their practical usefulness.

(4) *Paper coatings, wet-end additives and adhesives.* The label for preservatives intended for use in adhesives, wet-end additives, glues, sizing, etc., must be specific in describing the substance to be preserved; for example, starch-based adhesive, protein-derived adhesive, animal glue, corn starch solution, etc. The effective dose range for each type of sub-

stance to be preserved must be specified in the directions.

(5) Textile additives. The label directions for such products must clearly differentiate between preservative action and antimicrobial activity outside the treated material itself. Adequate directions must be provided either on the label or in collateral labeling that describe how the product should be added to the textile material, the limiting chemical or physical factors that should be noted in the application, and the type(s) of textile material for which the product is intended.

(6) Antimicrobial additives for sugar mills. Since cane or beet sugar processing is continuous, label directions must include proportioning pump delivery rates of product, per ton of sugar produced, per 24 hr.

§ 162.73 Specific comments on aquatic pest control agents.

(a) *Drinking water systems (human)*. (1) Water-treating chemicals should not be designed as sterilizers, and only claims for water sanitizing and/or water disinfection can be justified. Presently chlorine-type products are the disinfectants of choice in treating human drinking water and drinking water systems. The directions for treating the water itself, however, and the directions for treating the various parts of the water system should be differentiated. Iodine-type products may also be used for field or emergency treatment of drinking water.

(2) The amount of available chlorine necessary to disinfect drinking water will depend directly upon the chlorine demand of the water supply. Thus, it is not practical to attempt to be precise with respect to the minimum concentration which must be recommended. In general, recommendations should provide for a free residual available chlorine concentration of at least 0.2 ppm throughout the system. The amount of chlorine which must be added to accomplish this concentration will vary widely and may be as high at 10 ppm. With residuals higher than 2 to 2.5 ppm, taste becomes a factor in acceptance. Chemical control tests for free residual chlorine are necessary and must be specified on the label.

(3) With iodine, the concentration required to disinfect water will vary from 0.6 to 4.3 ppm, depending upon such factors as temperature and pH. For emergency treatments, 8 ppm should be sufficient to take care of water with iodine demands up to 4 ppm.

(4) For disinfecting standpipes and water mains before use, 50 ppm of available chlorine with a holding period of 24 hr should be specified.

(b) *Drinking water systems (poultry and livestock)*. Care must be exercised to differentiate between claims of value in disinfecting the water and claims of value as a medication for the animal. Medication claims identify the product as a drug as well as a pesticide and must be cleared with the Bureau of Veterinary Medicine of the Food and Drug Administration.

(c) *Weeds*. Control of weeds in irrigation systems, lakes, ponds, rivers and streams means the reduction of unwanted weeds or algae to a level that will not interfere with optimum water management and navigation. The directions for use must include:

(1) The sites intended to be treated.

(2) The types of weeds (floating, emersed or submersed) intended to be controlled.

(3) The common names of weeds to be controlled, such as cattails or water hyacinth. For algae, only the type need be stated (blue-green algae or filamentous green algae).

(4) The dosage appropriately expressed. For application to moving bodies of water, use weight or volume of product per unit volume of flow per unit of time.

(5) The method of application, such as broadcast (for granules), surface spray or subsurface injection. Surface spray application also requires that the name of the diluent, if any, the concentration, and any necessary limitations on spray droplet size (for example, 400- to 800-micron) be specified.

(6) The time of first application in terms of stage of growth of the weeds or season of the year.

(7) The number of applications per year and the interval between treatments.

(8) Any necessary limitations on the use of the product or of the treated water, such as:

(i) The area or fraction of the site to be treated at any one time to avert fish kill.

(ii) The interval between last application and the use of the treated water for drinking by man and domestic animals, or for irrigation, crop spraying, fishing and recreation.

(d) *Fish and mollusks*. (1) Fish control product labels must name the individual species to be controlled, unless the performance data clearly demonstrate effectiveness against an entire group of fishes. Trash fish will be unacceptable unless the data shows effectiveness against representatives from all groups.

(2) Marine molluscicide product labels must specify the organisms (for example, oyster drills) to be controlled. Labels for freshwater molluscicide products, conversely, may make a general claim for freshwater snails. (See also topic on antifouling paints.)

(e) *Mosquito Larvicides*. (1) Because these products are applied to lakes, ponds, estuaries and swamps, involving relatively large areas, special precautions are usually required on the labeling, particularly in respect to hazards to fish and wildlife.

(2) Label claims for human and animal disease prevention or control are not acceptable on household or other products for limited application; for example, around bird baths, fish pounds or farm ponds.

(f) *Swimming pools*. (1) Available chlorine, from both inorganic and organic compounds, is the most commonly registered disinfectant for swimming pool water. Specific directions for the chlorination of unstabilized swimming pool water with inorganic compounds must provide for a minimal available chlorine residual of 0.6 to 1 ppm to be maintained at all times. In addition, the directions should provide for a superchlorination procedure for newly filled pools. Instructions to test pool water with test kits, to maintain the proper available chlorine level and to maintain a pH of 7.2 to 7.6, must also appear on the label. Representations that a product will maintain chlorine residuals for lengthy periods of time without frequent checks with a chlorine test kit are unacceptable. It must be emphasized to the consumer that the maintenance of a chlorine residual is dependent on ambient temperatures, light intensity and bather load.

(2) Most organic and some inorganic chlorine-bearing chemicals are recommended for use in the presence of a chlorine stabilizer. There is ample evidence to show that the concentration of residual chlorine needed to maintain effectiveness must be increased in the presence of various concentrations of stabilizing agents. Thus, those chlorine products recommended for use with stabilizing agents must specify a minimum maintenance dose range of 1 to 1.5 ppm residual chlorine in lieu of data from controlled field trials sustaining the validity of lower concentrations. Claims of effectiveness at a sanitizing level and claims of effectiveness against athlete's foot fungi in footbaths are unacceptable for such products.

(3) Iodine and bromine products are employed less frequently as swimming pool water disinfectants. Similar pertinent directions for use are required for the registration of these products.

(4) No evidence has been developed to show that quaternary ammonium compounds will provide the minimum level of effectiveness required by public health officials, and these products are unacceptable as swimming pool water disinfectants. They have been accepted, however, for sanitizing and disinfecting pool associated surfaces when the requirements as surface-treating chemicals have been met. Quaternary ammonium compounds also have been registered as algae control agents in swimming pool water.

(5) To register swimming pool algaecides, the directions for use must specify:

(i) The place of application; for example, apply to the water along pool edges.

(ii) The types of algae intended to be controlled.

(iii) The dosage and pattern of use. This will usually include, but is not limited to:

(A) Initial dosage (or dosage range) when pool is free of visible algae.

(B) Initial dosage (or dosage range) when the pool contains visible algae growth. The pattern of use must specify reapplication of initial dose at stated intervals until algae growth is visibly controlled and the debris is removed.

(C) The maintenance dosage (or dosage range) and the intervals between maintenance dosages.

(g) *Industrial cooling water systems.* (1) Control of bacteria, fungi or algae within cooling water systems means to stabilize the microbial population at such a level that slimes will not interfere with system efficiency.

(2) Broad claims for use, such as microbiocide, microbiostat, slimicides and microorganism control, are acceptable only when they are modified by (i) naming the types of organisms (algae, bacteria, fungi) for which control is intended, and (ii) identifying the industrial or commercial recirculating water cooling systems; for example, industrial (and/or commercial) recirculating cooling water towers, air washers and/or evaporative condensers. Such terms as biocide or biostat are unacceptable where only microorganism control is to be construed.

(3) Cidal claims are acceptable only where tests demonstrate that the product effectively reduces the number of living algae, bacteria or fungi. Static claims are to be made for products where tests demonstrate that they provide temporary control or growth suppression. The claim for a type of activity (cidal or static) must be related to each particular use claimed on the labeling. Examples include: microbiocide for use in industrial recirculating cooling water towers to reduce the number of living algae, bacteria and fungi; and microbiostat (microorganism control) for use in industrial recirculating cooling water towers to control the growth of algae, bacteria and fungi.

(4) Directions for general microbial control must include, but are not limited to, the following:

(i) Where in the system the product is to be applied; for example, at a point in the system where it will be uniformly mixed.

(ii) The timing of application; for example, when the system is in jeopardy of becoming impaired or after cleaning a system whose efficiency is already impaired.

(iii) The dosage to be applied. The dosage rate for solid products must be specified in weight of product per unit volume of water. Labels of products formed into tablets, briquettes or other uniformly sized shapes should state the weight of each unit. If the dosage rate for liquid products is stated as fluid volume, or parts per million, of product per unit volume of water, the product weight per gallon must be shown on the application. If, however, liquid products are added on a weight basis, the product weight per gallon must be shown on the label.

(iv) The method of application or pattern of use. An initial application dosage, which may be repeated, is followed by subsequent lower dosage applications. The initial dosage range is to control noticeable contamination, to satisfy the demand of the system which may have extensive but not noticeable contamination or to rapidly develop a desired level of toxicant in the system water. The subsequent dosage range is to inhibit the growth of microorganisms remaining or subsequently introduced into the system. In case of extensive reinfestation of the system, the initial dosage range should be applied until control is again evident. Examples of various methods of application or patterns of use are given below.

(A) *Intermittent or slug method.* The directions must stipulate an initial dosage range of relatively high product concentrations to obtain control of obvious microbial contamination. When microbial control is evident, a subsequent dosage range, of relatively lower product concentrations, must be stated. The label must state the usual time interval between doses, or include the phrase, as needed to maintain control, or both. The label must not claim maintenance of any particular pesticide concentration. Example of direction for use:

Initial Dose. When the system is noticeably fouled, apply ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water in the system. Repeat until control is achieved. Badly fouled systems must be cleaned before initial treatment.

Subsequent Dose. When microbial control is evident, add ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water in the system every ------ day [weekly], or as needed to maintain control.

(B) *Modified intermittent method.* This is similar to the intermittent or slug method except that the interval between treatments is based on the time for a stated fraction of the system water to be lost by blowdown. This method of application may allow a claim to maintain the pesticide concentration within stated maximal and minimal limits. Example of direction for use:

Initial Dose. When the system is just noticeably fouled, apply ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water in the system. Apply half [or ⅓, ¼, or ⅕] of this initial dose when half [or ⅓, ¼ or ⅕] of the water in the system has been lost by blowdown. Badly fouled systems must be cleaned before initial treatment.

Subsequent dose. When control of microbial growth is evident, apply ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water in the system. Apply half [or ⅓, ¼ or ⅕] of the subsequent dose when half [or ⅓, ¼, or ⅕] of the water in the system has been lost by blowdown.

(C) *Continuous feed method.* The label should specify an initial slug dose, based on the volume of water in the cooling system, to establish an initial product concentration. For volatile products, continuous feed is based on total makeup water. For nonvolatile products, continuous feed is expressed as amount of product to be applied per stated volume of water lost by blowdown. The claim to maintain a pesticide concentration in the system may be made for this method of application. Example of direction for use:

Initial Dose. When the system is just noticeably fouled, apply ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water in the system. Badly fouled systems must be cleaned before initial treatment.

Subsequent Dose. Maintain this treatment level by starting a continuous feed of ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ------ [unit volume] of water lost by blowdown.

(D) *Briquettes or Tablets.* These may be considered slug dose methods of application. Data must be submitted showing the rates of dissolution of the product in water at various temperatures and flow rates. Example of direction for use:

Slug dose the system with ------ [number or unit weight of briquettes or tablets] of ------ [product name] per ------ [unit volume] of water in the system. (Name special container or name site in system.) Badly fouled systems must be cleaned before initial treatment.

(h) *Pulp and papermill water systems.* (1) Control of bacteria and fungi in pulp, paper and paperboard mill systems means to stabilize the microbial population at such a level that slimes will not interfere with system efficiency or product quality.

(2) Broad claims for use, such as microbicide, microbiostat, slimicide or microorganism control are acceptable only when modified by naming the types of organisms (bacteria, fungi) for which control is intended. Such terms as biocide or biostat are unacceptable where only microorganism control is to be construed.

(3) Cidal claims are acceptable only where tests demonstrate that the product effectively reduces the number of living bacteria and fungi. Static claims are to be made for products where tests demonstrate that they provide temporary control or growth suppression. The claim for a type of activity (cidal or static) must be related to each particular use claimed on the labeling. Examples include: Microbicide for use in pulp, paper and paperboard mill systems to reduce the number of living bacteria and fungi; and microbiostat (microorganism control) to control the growth of bacteria and fungi in paper machine systems.

(4) Directions for general microbial control must include, but are not limited to, the following:

(i) Where in the system the product is to be applied; for example, at a point in the system (fan pump, beater, pulp chest) where it will be uniformly mixed.

(ii) The timing of application; for example, continuously or intermittently for a certain number of hours per day or per shift.

(iii) The dosage to be applied. The dosage rate for solid products must be specified as weight of product per ton (dry basis) of pulp or paper produced. Labels of products formed into tablets, briquettes or other uniformly sized shapes must state the average weight of each unit. If the dosage rate for liquid products is stated on a fluid volume basis, the product weight per gallon must be shown on the application. If, however, liquid products are to be added on a weight basis, the product weight per gallon must be shown on the label.

(iv) The method of application and pattern of use. In a mill system, dosage range depends on the severity and location of contamination. Methods of application are described as slug, intermittent or continuous.

(A) *Slug method*. Slug treatment, the addition of a specified dose of a pesticide to the system at one time, is intended to provide a high concentration of the toxicant for a short term. Slug treatments may be repeated at stated intervals, usually once a day or less frequently. Example of direction for use:

Apply ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ton (dry basis) of pulp or paper produced, as a slug dose. If needed, repeat ------ [stated interval]. Badly fouled systems should be cleaned before initial treatment.

(B) *Intermittent feed method*. Treatment is on a semicontinuous basis; for example, for 2 hr during each 8-hr shift. Directions must stipulate the dosage range to be employed, the usual time interval between doses, and the timing of application. The label must not claim maintenance of any particular pesticide concentration. Example of direction for use:

Apply ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ton (dry basis) of pulp or paper, for ------ [hr] every ------ [hr]. Badly fouled systems must be cleaned before initial treatment.

(C) *Continuous feed method*. Treatment is on an uninterrupted basis to provide a sustained concentration. The label should specify a dosage range that usually is somewhat lower than that for intermittent feed. In many cases, intermittent feeding may be used to achieve initial control, followed by lower-dosage continuous feeding to maintain control. Examples of directions for use:

Apply ------ to ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ton (dry basis) of pulp or paper produced on a continuous basis. Badly fouled systems must be cleaned before initial treatment.

Apply ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ton (dry basis) of pulp or paper produced for ------ [hr] every ------ [hr]. This regimen may be repeated until the desired control is achieved. When control is accomplished, apply ------ [fluid volume or unit weight] of ------ [product name or active ingredient] per ton (dry basis) of pulp or paper produced on a continuous basis. Badly fouled systems must be cleared before initial treatment.

(D) *Briquettes or Tablets*. These may be considered either a slug or intermittent method of application depending on the rate of dissolution. Data must be submitted showing the rates of dissolution of the product in water at various temperatures and flow rates. Example of direction for use:

Slug dose the system with ------ [number or unit weight of briquettes or tablets] of ------ [product name] per ton (dry basis) of pulp or paper produced. (Name special container and/or site in systems where the product is to be applied, so that mixing and distribution is uniform.) Badly fouled systems must be cleaned before initial treatment.

(i) *Antifouling Paints*. Label directions should prescribe the number of coats, the time interval between coats, and the time interval between the last coat and launching, when these factors are essential to the performance of the product. Currently it is not necessary to claim specific pests to be controlled, but the intended broad group or groups (algae and/or marine fouling animals) should be stated.

§ 162.74 Specific comments on fungicides and nematicides.

(a) *Coatings*. Fungicides intended for the preservation of coatings are pesticide products (industrial fungicides) and must be registered before they are shipped to the coating's manufacturer. (See General Comments, Claims for Manufacturing Use Only and Claims as Preservatives.) Formulated coatings containing fungicides that are not considered pesticides are those which have been treated to protect the coating itself against the growth of fungi while in the can [§ 162.4(d)(2)].

(b) *Mildew control*. (1) The control of mildew in homes, institutions, buildings, and similar environments, or the protection of articles or materials used or stored in such environments, is a very important aspect of pesticide usage. Mildew is defined here as the growth of molds (simple plants classified as filamentous fungi) on various surfaces, such as walls and ceilings, materials and articles made of leather, fabrics, paper, and wood, often causing musty odors.

(2) Formulations intended to be used to control mildew must state this claim on the labeling and provide adequate directions for use; that is:

(i) Name the types of surfaces, articles or materials to be treated and, when appropriate, specify cleaning before treatment.

(ii) State the rate of dilution or the concentration to use, if applicable.

(iii) State the method, degree and extent of application (for example, spray surfaces until moist or apply to dampen).

(iv) State recommendation with respect to the need for repeating applications at specified intervals (as determined by tests of residual properties).

(3) Some claim words and phrases are so broad that they are subject to many interpretations. Some imply different types of activity. Also, certain formulations have residual properties; others do not. The position of the Environmental Protection Agency with respect to various claims is as follows:

(i) The term fungicide (denoting killing action) or fungistat (denoting inhibition of fungal growth), when unmodified with respect to specific claims intended, may be interpreted as a claim that a product is effective against both (A) pathogenic fungi, such as Trichophyton interdigitale, or athletes foot fungus, on environmental surfaces; and (B) nonpathogenic fungi that cause mildew. Different tests are required for the 2 groups.

(ii) Two major categories of mildew claims are recognized, based on the degree of effectiveness implied by the wording of the claims.

(A) Kill claims mean kills mold and mildew fungi in all stages. Some equivalent claims are fungicide and destroys musty odors at their source. Chemicals, such as chlorine-releasing compounds, isopropyl alcohol and other volatile materials, may kill fungi on contact but have no residual properties to protect treated surfaces from later infestations. The claim for these products should be modified by adding nonresidual after the action word; for example, destroys mildew (nonresidual) or kills mildew fungi (nonresidual). An alternative would be destroys or kills mildew on contact, or similar phraseology. For formulations which kill fungi and also leave an effective residue, the direction should state the time interval (determined by testing) before repeated application is needed.

(B) Prevent claims mean that the treatment will prohibit the growth of mold or mildew organisms and denotes a strong and lasting residual property for a stated period of time (determined by testing). Equivalent claims are mildewproof, stops mildew and prevents musty odors at their source.

(NOTE: the claim aids in preventing mildew growth is unacceptable; the claim aids in control, however, is acceptable.) Lesser claims than prevent claims are controls, inhibits growth, mildew resistant, minimizes mildew, retards mildew, fungistatic.

(iii) Where a claim for musty odors (mustiness) is unqualified as to the causal organisms, it is assumed to include the control of mildew growth, which is a source of such odors.

(iv) Volatile products—products such as paradichlorobenzene cakes that control mildew growth by releasing vapors—must specify: (A) A dosage rate in terms of amount per cubic foot of space, (B) that the space be tightly enclosed or sealed, and (C) that additional material be added when the treated space is opened or unsealed. A claim that is worded clearly as a deodorant action (that is, masks or neutralizes the odor without direct action on the causal organism) is not considered a pesticide claim.

(v) Mildewproof and mildew resistant are considered fungistatic claims. Unless stated otherwise, they imply long-lasting protection to treated articles or materials—months, year or for the life of the materials. Such claims must be supported by long term tests which compare untreated and treated test samples of the articles or materials that have been exposed to mildew organisms in a simulated tropical environment.

(vi) Removes mildew stains is not considered a pesticide claim.

(c) *Nematode Pest Claims*. Depending upon the results obtained in nematicide efficacy tests, nematode pest claims may either be general or specific in nature. Specific claims must include the common names, (lesion, root-knot, cyst, etc.) of the nematodes to be controlled; general claims need only specify "nematodes" or "plant-parasitic nematodes."

§ 162.75 Specific comments on invertebrate control agents.

(a) *Household insecticides.*—(1) *Nonresidual insecticides.* (i) These products are ordinarily marketed as solutions, emulsions, suspensions, or pressurized products and designed for use in undiluted form by the consumer. In a few cases, concentrated products requiring dilution are marketed. The products usually have a petroleum distillate base, together with such auxiliary solvents as may be necessary to keep the formulation as a solution under conditions of relatively low temperature. Methylated nephthalenes, methylated aromatic petroleum solvents, and methylene chloride are frequently used as auxiliary solvents, although methylene chloride is more common in pressurized products. Water is sometimes used in liquid formulations. The propellants commonly encountered are Propellant 11 (trichloro monofluoro methane) and Propellant 12 (dichloro difluoro methane). Propellant 12 may be used alone or in various proportions with Propellant 11, methylene chloride, or methyl chloroform. Specific considerations relating to directions for use and precautionary statements for these products are discussed below.

(ii) In all cases, the products' labeling should bear adequate directions for use against all of the insects named in the labeling. These products are usually recommended for use against a number of household insects, including houseflies, mosquitoes, roaches (water bugs), bed bugs, ants, carpet beetles, brown dog ticks, clothes moths, wasps, and hornets. They are not effective against all household insects, and claims for effectiveness against insects generally or all insects are unwarranted and should not be made. Also, these products are primarily contact insecticides and, to be effective, must hit or wet the individual insect with the spray mist. Thus, as customarily marketed, they are not effective against termites and cannot be relied upon to kill any insect which cannot be reached directly by the spray. This applies also to the eggs of many insects, which are often placed in inaccessible cracks or hidden surfaces.

(iii) Since the habits and life cycles of different insect pests vary considerably, the directions must, in each case, be adapted to the particular variety of insect, as enumerated below, which is causing annoyance and the type of structure or building in which the product is used.

(A) *Flies and mosquitoes.* Directions for use should provide for closing doors and windows and thoroughly spraying all parts of the room, particularly toward the ceiling, so as to fill the room with a fine mist. The room should be kept closed for 10 to 15 minutes and the fallen insects should be swept up and destroyed. When strong formulations containing substantial amounts of rapidly acting paralytic agents are used, however, it is simply necessary to ascertain that the various insects have been thoroughly enveloped in the spray mist. Pressurized aerosol formulations, pressurized sprays and liquid products may be used in a similar manner. Dosages of aerosol and pressurized formulations are sometimes expressed in terms of seconds of discharge, with appropriate adjustments for low and high delivery rate dispensers. These dosages usually are in the range of 4 to 5 g of aerosol mixture in mist form per 1000 cu ft of space. The labeling should contain cautions to protect food and food utensils from contamination and to thoroughly clean any utensils, silverware, or dishes that might be contaminated.

(B) *Household ants and roaches.* The directions for use should provide for thoroughly spraying all parts of the room suspected of harboring these pests, especially cracks and hidden surfaces around sinks or food storage areas where the insects may be hiding. In all cases the insects must be contacted directly with the spray. Treatment around doors and windows is desirable in directions for use against ants. Pressurized formulations may be used, but since liberal application is essential, small pressurized dispensers may not give as good results in some cases. Repeated applications should be specified in all cases. The labeling should also contain cautions to protect food and food utensils from contamination and to thoroughly clean any utensils, silverware or dishes that might be contaminated.

(C) *Bed bugs.* The directions for use should provide for thoroughly spraying the bed, springs, and mattress, as well as the baseboards and wall cracks about the bedroom. Repeated applications are usually necessary for good results against these pests.

(D) *Clothes moths and carpet beetles.* The directions for use should provide for cleaning all articles to be protected and for thorough spraying, particularly of seams and folds. The interior of trunks, closets, cupboards, and other storage containers should also be thoroughly sprayed. Unless the sprayed articles are to be stored immediately in moth-tight containers, the directions should provide for repeating treatment at least once a month. For upholstered furniture, the directions should provide for spraying the interior as well as the outer surfaces of the furniture, unless the furniture can be fumigated to kill any hidden infestation of these pests. Rugs and carpets that are to be treated may also be sprayed on both the top surfaces and the under sides. When carpet beetles are a serious problem, however, a residual-type insecticidal treatment is preferable. Pressurized products, including aerosols, are less suitable for moth and carpet beetle treatments, since small dispensers do not ordinarily permit the liberal application that is usually necessary for good results.

(E) *Fleas and brown dog ticks in buildings.* Directions for use should provide for liberal applications to floor areas, cracks and crevices, sleeping quarters of animals, behind pictures, and wherever these insects are suspected of harboring. Liberal and repeated applications directly to the individual pests are desirable in all cases.

(F) *Mosquitoes and small flying insects outdoors.* Liquid and pressurized products can often be used effectively as mist spray applications for tall grass and shrubbery and around lawns where these pests may hover or harbor. This usage is suitable only in still air and requires frequent reapplication to kill additional insects that may be drifting into the area. It is not suitable for coping with any large influx of insects. Since many of these formulations are phytotoxic, care should be exercised to avoid wetting vegetation, and only mist spray application should be directed.

(G) *Hornets and wasps.* The directions for use should give instructions to spray the nests in the evening after the insects have congregated and are at rest.

(2) *Residual insecticides.* (i) These products are ordinarily marketed as oil solutions, emulsions, suspensions, powders, or pressurized products. Some are designed for use in undiluted form by the consumer; others are concentrated products that require various degrees of dilution. The products usually have a petroleum distillate base, together with such auxiliary solvents as may be necessary to keep the formulation as a solution under conditions of relatively low temperature. Methylated naphthalenes, methylated aromatic petroleum solvents, methylene chloride and methyl chloroform are frequently used as auxiliary solvents, although the last two are more common in pressurized products than in liquid formulations. Water is sometimes used in the liquid formulations. The propellants commonly encountered are Propellant 11 (trichloro monofluoro methane), Propellant 12 (dichloro difluoro methane), nitrogen, carbon dioxide, nitrous oxide, and certain hydrocarbons, such as propane. Propellant 12 is used alone or in various proportions with Propellant 11, or with methylene chloride or methyl chloroform together with small amounts of propane. Pressurized products of this class usually contain lower levels of propellants than are commonly encountered in the nonresidual-type products discussed above. Mothproofing treatments of woolens and fabrics to impregnate them with a protective chemical residue are excluded in this discussion, since they usually entail professional application. Specific considerations relating to directions for use and precautionary statements for these products are discussed below.

(ii) When general application is specified in the directions for use, the residual treatment may be applied to as many areas of the infested premises and to as large a proportion of the available surface as may be considered necessary for effective pest control. When usage is limited to "spot application," much greater attention should be given to limiting the treatment to those surfaces where pests have been seen or where they are suspected of hiding. Such treatments would normally be limited to a maximum of 20 percent of the floor and lower wall surfaces, including shelving and cabinets.

(iii) Many of the formulations are not acceptable for mist spray application in the air and care should be exercised to apply the products as relatively coarse wet sprays which will adhere to treated surfaces. This is especially important in the case of pressurized products.

(iv) Claims that residual insecticidal value will last for any particular period of time are usually undesirable because of the variable conditions under which the products are used. It may be stated that the product is a residual insecticide, but the labeling should emphasize the need for repeated applications as often as necessary, since it is not possible to anticipate all of the conditions of use, types of surfaces to be treated, and cleaning operations on treated surfaces.

(v) In all cases the products' labeling should bear adequate directions for use against all of the insects named in the labeling. These products are commonly recommended for the control of roaches (water bugs), houseflies, mosquitoes, silverfish, spiders, bed bugs, ants, carpet beetles, scorpions, fleas, brown dog ticks, crickets, wasps, hornets, earwigs and box-elder bugs. They are *not* effective against all household insects and claims for effectiveness against insects generally or all insects are unwarranted and should not be made.

(vi) Since the habits and life cycles of different pests vary considerably, the directions must, in each case, be adapted to the particular kind of insect, as enumerated below, which is causing annoyance and to the type of structure or building in which the product is used.

(A) *Flies and mosquitoes.* Directions for use should provide for thorough treatment of surfaces where these insects are known to alight or congregate. Emphasis should be placed on spraying or applying powders around doors, windows and porches. The labeling should contain cautions to protect food and food utensils from contamination and to thoroughly clean any utensils, silverware, or dishes that might be contaminated.

(B) *Household ants, roaches, silverfish, crickets, earwigs and box-elder bugs.* The directions for use should provide for thoroughly spraying or distributing the product into parts of the room suspected of harboring these pests, especially cracks and hidden surfaces around sinks or food storage areas where these insects may be hiding. Thorough treatment around doors and windows is desirable in directions for use against ants. Spraying around baseboards, windows, door frames, bookcases, and storage areas is usually desirable in directions for use against silverfish, crickets, earwigs, and box-elder bugs. The labeling should contain cautions to protect food and food utensils from contamination and to thoroughly clean any utensils, silverware, or dishes that might be contaminated.

(C) *Bed bugs.* The directions for use should provide for thoroughly spraying the bed, springs, and mattress, as well as the baseboards and wall cracks about the bedroom.

(D) *Carpet beetles.* The directions for use should provide for thorough application along baseboards, edges of carpeting, under furniture, under carpeting and rugs, and in closets and shelving where these insects are seen or suspected.

(E) *Fleas and brown dog ticks in buildings.* Directions for use should provide for applications to floor areas, cracks and crevices, sleeping quarters of animals, behind pictures and wherever presence of these insects is suspected. Liberal and repeated applications to the infested areas are desirable in all cases. Spot applications are not suitable for the control of fleas.

(F) *Spiders and scorpions.* Directions for use should provide for thorough wet spraying or dusting around windows, doors, baseboards, and crawl spaces, where these pests may occur.

(G) *Pantry pests.* Saw-toothed grain beetle, confused flour beetle, rice weevil, cigarette beetle, drug-store beetle, and Indian-meal moth are included in this category. Although cleanliness and good housekeeping are basic to preventing losses because of these pests, insecticides may sometimes be used carefully to advantage. Directions for use should provide for the removal of all packages of food and for the treatment of the surfaces of the shelves and the interior of cupboards with a residual spray. The spray must be allowed to dry before the packages are replaced on the shelf. Shelf paper or foil should be used to prevent contact of food or utensils with sprayed surfaces. It should be emphasized that this type treatment is of only supplemental value, since it does not affect the insects breeding inside the packages. Infested food packages should be destroyed or fumigated.

(H) *Hornets and wasps.* The directions for use should give instructions to spray the nests in the evening after the insects have congregated and are at rest.

(3) *Mosquito Abatement.* Label directions on mosquito coils should be limited to repelling mosquitoes on patios, porches, or similar confined outdoor areas where there is little or no breeze. Labels should instruct users to burn more than one candle or torch to provide sufficient repellent smoke or vapor to be effective.

(b) *Food Handling establishments.* (1) Nonresidual space and contact insecticides with labels including directions for use in food handling establishments must bear the following or similar caution:

> When using the product in food handling establishments, apply only when the facility is not in operation. Food should be removed or covered during treatment. All food processing surfaces should be covered during treatment or thoroughly cleaned before using.

(2) These products are applied to obtain insecticidal effects only during the time of treatment. Space treatment is the dispersal of insecticides into the air by foggers, misters, aerosol devices or vapor dispensers to control flying insects and exposed crawling insects; contact treatment is the application of a wet spray.

(3) Some bait-type products may be used in food areas during periods when operations are shut down and all food and food handling surfaces are well protected or removed. Labeling should state that all bait containers must be removed and that cleaning procedures are required before operations are resumed.

(c) *Farm structures.* Label directions must specify the areas of treatment and the insects to be controlled. Directions on products intended to control stable flies should limit the sites of application to outdoor surfaces, since these insects rarely go inside enclosed structures. Labels must emphasize the following precautions, if pertinent.

(1) Do not contaminate food or feed products, drinking fountains, litters and troughs.

(2) Ventilate before allowing animals to reoccupy treated premises.

(3) Do not use in milk processing rooms, milk houses or milk storage rooms.

(4) Do not use in houses.

(5) Do not use on animals.

(6) Do not spray freshly whitewashed surfaces.

(7) Do not store or apply to surfaces within reach of children.

§ 162.76 Specific comments on vertebrate control agents.

The labeling submitted for registration must precisely identify the species of vertebrate pests against which the product is directed. Broad terms, such as rodents or nuisance birds, are unacceptable, unless the supporting research data actually includes representatives from all the principal groups. Even such terms as house rats and mice are unacceptable unless all 3 principal species, the brown rat (*Rattus norvegicus*), the roof rat (*Rattus rattus*), and the house mouse (*Mus musculus*), have been included in carefully controlled experimental studies.

CHEMISTRY

§ 162.77 Overview.

The following topics relate to data necessary for the general evaluation and registration of products and individual ingredients. All raw research data, such as gas chromatograms, photographs of thin-layer chromatograms and scintillation counter printouts, should be retained and available for 5 years, should the Office of Pesticide Programs request their submission. Also, all data placed on magnetic computer tape, such as total ion current chromatograms and mass spectra of significant components within a total ion current chromatogram, should be available for replay.

§ 162.78 General product chemistry.

Information related to general product chemistry also appears in § 162.10, Labeling Requirements—Net Contents, Ingredient Statement and Precautionary Statements.

(a) *Basic manufacturing process.* Information on the basic manufacturing process and on the purity of starting and intermediate materials should be submitted by the basic manufacturer with registration applications and petitions for tolerances. Other registrants may refer to the source of the technical chemical used in their product. Purity levels of such materials can vary considerably; significant changes in the materials or production methods also can introduce new types or concentrations of impurities. These purity levels or changes can affect the performance or safety of the final product. A description of quality control procedures is required for disinfectant-type products and may be requested for other products where an impurity might induce an unreasonable adverse effect or affect the efficacy of the product.

(b) *Information required for active and inert ingredients.* The chemical composition of each pesticide, including both active and inert ingredients, must be submitted in a confidential statement or formula. (See Registration Procedures for a sample form and specific instructions for completing it.)

(2) In determining whether an ingredient is active or inert, the Administrator shall consider:

(i) The ingredient's capability by itself, when used as directed, to effectively control the target pest or perform as a plant regulator, defoliant, or desiccant.

(ii) The ingredient's presence in the product in a sufficient amount to add materially to its effectiveness.

(iii) The ingredient's influence on the activity of the principal active ingredient. The Agency may require that an ingredient be designated an active ingredient if it sufficiently increases the effectiveness of the pesticide to warrant such action.

(3) Unless they have pesticidal efficacy of their own, inert ingredients would include the following types of ingredients: Solvents, such as water; baits such as sugars, starches, and meat scraps; dust carriers, such as talc and clay; fillers; wetting and spreading agents; propellants in aerosol dispensers; and emulsifiers. These ingredients are not considered active ingredients although their use is necessary in the practical application of the pesticide.

(4) Active Ingredients: Chemical evaluation requires that certain basic information be available for each pesticide chemical. Although not usually required for established pesticide chemicals, it must be furnished with applications for registration of products containing any ingredient(s) not previously registered. This information includes, but is not limited to, the following:

(i) The common name, if established.

(ii) A well defined chemical name (Chemical Abstracts nomenclature).

(iii) Trade name.

(iv) Structural formula.

(v) Melting point.

(vi) Boiling point.

(vii) Vapor pressure.

(viii) Density or specific gravity.

(ix) Hydrolysis rate.

(x) Solubility in various solvents.

(xi) Dissociation constants (pKa or pKb).

(xii) Stability.

(xiii) Physical state.

(xiv) Color.

(xv) Odor.

(xvi) Composition of the technical product giving the names and percentages of the impurities.

(5) Inert ingredients: Although data requirements generally apply either to the individual active ingredients or to the entire formulation, if there is reason to believe that an inert ingredient may present problems of safety, environmental contamination or residue in crops, or if registration is requested for a formulation containing an inert ingredient not previously registered, some or all of the information required for active ingredients will be required for inert ingredients as well. As examples: The solvent dimethyl sulfoxide is restricted to a maximum of 15 percent of a formulation because it can penetrate the skin and injure the user; polychlorinated biphenyls and polychlorinated terphenyls cannot be used because they are very persistent in the environment and may detrimentally affect wildlife.

(6) Establishing a Common Name: If an ingredient has no common name, the Administrator may after due notice establish a common name, first considering names proposed by the applicant, registrant, or primary producers of the chemical. Names proposed by others also may be considered. Proposed names should be appropriate for the information and protection of the public. A simple chemical name may serve as a common name; a proprietary name or trademark will not be acceptable. The person proposing a common name will be responsible for ensuring that it does not infringe on a valid trademark, patent, or copyright. Names may be established by application to the K62 Committee of the American National Standards Institute, 1430 Broadway, New York, New York 10018. The Agency has available a compilation of all acceptable common and chemical names.[3]

(c) *Assay and impurity assessment for technical products.* (1) Analyses and the methods employed are required for the principal component and for the significant technical impurities in each pesticide chemical. These analytical techniques usually will be combinations of such methods as thin-layer chromatography, ion-exchange separation, gel filtration fractionation, liquid chromatography, gas chromatography, infrared spectroscopy and mass spectrometry. Limits of variation for each significant impurity should be provided for normal production batches of the pesticide chemical. Specifications for baseline levels of the various impurities can be established from these data.

(2) In addition to the preceding requirements, for technical ingredients not previously registered, a 2-g sample of a purified analytical standard (of known composition) of the pesticide chemical and a 10–20 g sample of a typical batch of the technical material may be required.

(d) *Information required for formulations.* Registration applications should also include the following information about the formulation:

(1) Miscibility in various solvents.

(2) If applicable, the pH, boiling point, flashpoint, specific gravity, viscosity and vapor pressure.

(3) Explosive characteristics, if any.

(4) Corrosion hazards.

(5) Capability of acting as an oxidizing or a reducing agent.

(6) For liquids, the weight of the active ingredient(s) per gallon.

(e) *Storage stability.* Data, usually chemical analysis, covering a period of at least 1 yr should be submitted to show storage stability. Normally, the product, as commercially packaged, must be stable for as long as it would be expected to remain in channels of trade. As a general rule, if during 1 yr, the percentage of any predominant active ingredient declines more than 5 percent from the original value, thereby becoming less than the percentage stated on the label, this would be significant. If significant deterioration does occur during normal storage periods, further justification for the product, including additional toxicity and performance testing, may be required, and the provisions of § 162.10(g)(6) concerning label warnings of deterioration will apply. Accelerated aging tests can sometimes be accepted on an interim basis, but shelf life studies under conditions usually encountered in transportation and storage shall be completed and the data submitted within 2 yr after registration.

(f) *Pesticides on tobacco.* (1) Tobacco is not listed as a raw agricultural commodity requiring the establishment of a tolerance. For registration purposes, the following residue considerations for products for use on tobacco include a total residue profile in the tobacco and the smoke. In addition to the parent compound, this profile includes polar and nonpolar plant metabolites, translocated degradation products from soil, and photodegradation products. Radiochemical techniques will normally be required; if significant residues are detected, analytical methods should be developed to characterize the residual products and test data should be submitted.

(2) If the pesticide use pattern represents a foliar treatment or application to soil, a study on followup crop tobacco may be required. This study should compile adequate data to show conclusively the level of residue likely to result from the directed use of the product, including:

(i) Residues on green, freshly harvested tobacco. Proceed with step 2 only if residues are detected.

(ii) Residues on cured or dried tobacco. Proceed with step 3 only if residues are detected.

(iii) Residues in smoke from treated tobacco. Proceed with step 4 only if residues are detected in smoke.

(iv) Identify significant pyrolysis products, and conduct subacute inhalation studies. (See Hazard Evaluation.)

§ 162.79 Environmental chemistry.

(a) *Pesticide fate and movement in soil*—(1) *Edaphic and climatic descriptions.* (i) The soil description should fit into a common textural classification.[4] The Soil Conservation Service (USDA) field office serving the county may be consulted in locating a representative site and in classifying the soil.

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[3] Robert L. Caswell, David E. Johnson, and Conrad Fleck, Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels, 2nd ed. (Washington, D.C.: U.S. Environmental Protection Agency, 1972).

(ii) The following physical and chemical properties of the surface soil should be determined: Organic carbon, cation exchange capacity (at pH 7), pH, bulk density, and water retentivity at ⅓ bar. Acceptable methods would include those described in the Soil Conservation Service, Soil Survey Investigations Report No. 1, or in the American Society of Agronomy Monograph No. 9. (See Appendix Part VI.) A complete report of the studies conducted, including a description of or reference to the actual method used, should be submitted.

(iii) Field studies with pesticides should also be supported by the following climatological and geographic information as appropriate:

(A) Sufficient descriptive data to locate the field plot(s) within a county or a parish.

(B) Amount of rainfall and/or irrigation water accumulative to each sampling.

(C) Soil and/or air temperature data from the State climatic division within which the field studies were performed.[5]

(2) *Soil Metabolism Studies.* (i) These studies should be designed to provide basic information on the rate, type and degree of degradation of the parent pesticide and its transformation products, including bound residues. Since knowledge of all major products formed is essential, studies with radiolabeled pesticides will be required. Radiolabeling should be in a strategic portion of the molecule that will remain in the significant degradation products. Usually, but not always, labeling will involve an aromatic ring. Some highly complex pesticides will require radiolabeling at several points in the molecule to assure adequate coverage of all chemical transformations. Greenhouse studies under controlled conditions are acceptable.

(ii) Rapid loss of carbon dioxide is not, in itself, satisfactory evidence of a product's safety. Although the major metabolic pathway may take this route, other routes may lead to the formation of small, but significant, amounts of byproducts. Sufficient data should be collected by periodic analysis to allow graphic plotting of the amount of parent compound until 10 percent or less remains. The data should clearly show the formation and decline rate of significant degradation products. Proper isomeric designations and structural formulas should be provided for each compound and significant degradation product.

(iii) As a result of the studies, clearly defined and validated analytical procedures for the separation and identification of degradation products and polar and nonpolar metabolites should be available. Of special importance are mobility (Rf) values on thin-layer chromatograms and relative retention times by gas chromatography. Studies should be supported by a complete list of all model compounds synthesized for use in the metabolism study or for any other purpose related to registration. In addition to this listing, details of method of synthesis and analytical method parameters should be furnished. Distribution coefficients (p-values) will be required on all significant degradation products. (See Appendix Part VI.)

(iv) Specific activity of the radiolabel should be capable of tracing metabolites down to 10 ppb in the soil. Counting levels should be at least twice that of the normal background level; or, if not, counting times should be long enough to provide a high degree of statistical significance. Critical counting data should always be obtained after total combustion to minimize quenching effects.

(v) Basic soil metabolism studies should be performed under aerobic conditions. For standardization and comparison, a soil with sandy loam, loam, or silt loam surface texture is preferred. (See Appendix Part VI.)

(vi) An additional abbreviated test using a fine textured surface soil is desirable to determine if significantly different levels of bound residues occur in such soils and to provide comparative qualitative data on metabolic products in a significantly different soil type. (See Appendix Part VI.) Residues remaining after exhaustive extraction with nonpolar solvents followed by polar solvents will be considered bound residues. An interim definition of a significant quantity of bound residue has been established as any amount of unextractable residue, greater than 10 percent expressed as parent compound, remaining 1 yr after a single treatment.

(vii) Data showing that a residue is strongly bound justifies continued experimental inquiry into the nature and possible significance of the binding mechanisms; potential for release; and slow long-term interactions of several different chemical substances. Therefore, the characterization of a residue that is strongly bound will require data related to the following questions.

(A) Will bound residues continue to increase with annual application of a pesticide to the same soil?

(B) Will a plateau be reached?

(C) What is the dissipation rate of bound residues?

(D) Can bound residues be taken up by subsequent crops growing in the soil?

(vii) In addition, tests to provide data relating to these questions may be needed:

(A) What is the nature of the bound products?

(B) In what constituent of the soil are they bound?

(C) What is the binding capacity of various kinds of soils?

(D) Do various pesticide degradation products compete for available binding sites? (For example, will phenols displace amines, or vice versa?)

(E) If the soil particles reach an aquatic environment, what pesticide fragments are released and over what period of time?

(ix) In addition to the aerobic soil metabolism studies, an anaerobic soil metabolism study will be required. (See Appendix Part VI.)

(3) *Soil persistence studies.* (i) Soil persistence data derived under actual use conditions are required in the main geographic and/or climatological areas for which a registration is proposed. Normally 4 sampling sites selected to represent ranges of the weather and soil elements will be adequate. Suitable classifications into soil regions include the 20 land resource regions described by the USDA.[6] Additional considerations should include the amount and the time distribution of precipitation and irrigation, mean air temperature for the growing season, and mean annual freeze-free periods.

(ii) Samples should be taken using statistically valid sampling schemes over a sufficient timeframe to allow a definitive assessment of the degradation profile. Besides the parent pesticide moiety, persistent degradation products of significant quantities should be determined. Suggested sampling times (after the last treatment) would include 0 days, 1 wk, 2 wk, 1 mo, 3 mo, 6 mo, 1 yr, and 18 mo. Sampling depth should be at least 0 to 6 in.; if the pesticide leaches, deeper sampling profiles may be necessary. The sampling should clearly encompass the entire vertical distribution of the parent pesticide and its major degradation products.

(iii) When possible, each site utilized should represent a major soil series in the particular geographic region. When 3 or more land resource regions are represented, however, at least one of the more northerly regions should be represented by a fine-textured surface soil (finer than silt loam).

(iv) For many pesticides with low-to-moderate persistence (half degradation times of less than 6 mo), the preceding studies will provide adequate data on the degradation profile under typical field conditions. Some agricultural pesticides, however, that are not incorporated directly into the soil, such as those applied to foliage or used in preemergence weed control, may yield ambiguous soil persistence data. In these cases, supplemental soil persistence studies in which the pesticide is incorporated directly into the upper soil horizons may be appropriate. (See Appendix Part VI.)

(v) If a pesticide or its degradation products are highly persistent, special long-term studies to determine buildup of these substances may be required. Usually, studies would entail selecting test fields and employing the maximum allowable application rate and number of treatments (according to the label instructions) for a succession of growing seasons. Test areas would be selected for climatological conditions most favorable to stability of the parent compounds. These studies should continue until it is clearly demonstrated that a plateau level or equilibrium is reached; or the buildup due to repeated applications of the pesticide can be predicted.

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[4] U.S. Department of Agriculture, *Soil Taxonomy*, Agricultural Handbook No. 436 (Washington, D.C.: U.S. Government Printing Office, in press).

[5] U.S. Department of Commerce, *Climatic Atlas of the United States* (Washington, D.C.: U.S. Government Printing Office, June 1968).

[6] U.S. Department of Agriculture, *Land Resource Regions and Major Land Resource Areas of the United States*, Agricultural Handbook No. 296 (Washington, D.C.: U.S. Government Printing Office, 1972).

(4) *Leaching studies.* Laboratory scale leaching studies on the parent compound and its soil degradation products will be required. If a high degree of mobility is observed for the pesticide or one of its degradation products, special field studies may be required. (See Appendix Part VI.)

(b) *Pesticide fate and movement in water.* Typical studies which may be required for a new pesticide product, including the parent compound, metabolites and any important degradation products, are summarized below. The appendix provides information on various tests that can be performed to obtain data.

(1) *Dissipation rate in distilled water.* These studies should include:

(i) Data on the rate of hydrolysis at acid, basic and neutral pH values. Test temperatures should span the range of water temperatures anticipated under actual pesticide use patterns.

(ii) Suitable photodegradation data at a pH where maximum stability has been noted.

(2) *Degradation in water containing suspended solids.* These studies should determine:

(i) The effect of suspended sediment under natural conditions. Studies should include qualitative and quantitative data on any major metabolite and degradation product.

(ii) Duration of biological activity, such as phytotoxicity.

(3) *Degradation studies in bottom sediments.* If residues accumulate in bottom sediments, dissipation curves should be determined in sediments representative of those likely to be encountered under normal conditions of use.

(4) *Translocation.* Laboratory and/or field studies on pesticide movements should include:

(i) Uptake of the pesticide and its breakdown products by roots and foliar surfaces of typical crops and aquatic plants that would be receiving some or all of their water from the aquatic source.

(ii) Residue levels in irrigated, flooded, or otherwise artificially watered food crops.

(5) *Livestock and poultry drinking water.* Studies should show levels of residues, if any, in milk, animal tissues and eggs in relation to the concentration of the pesticide in water.

(6) *Tests involving moving waters.* Data on rate and extent of movement in flowing water would normally be obtained in one or more of the following ways:

(i) Chemical analysis of water from selected points downstream from source of entry.

(ii) Bioassay of water from selected downstream points, using highly sensitive aquatic plant or animal organisms.

(iii) Chemical analysis of residue buildup in selected indicator organisms.

(c) *Pesticide residue studies*—(1) *Fish and wildlife studies.* (i) Fish residue studies must be conducted to determine the amount of uptake of the pesticide and its major degradation products by fish, until a plateau has been reached and the rate of dissipation of any residue taken up by fish when placed in pesticide-free water. These studies are usually run in dynamic flow-through systems, but, with adequate controls, static tests are acceptable.

(ii) Normally, the fish residue requirements can only be met using radiochemicals. Detailed test procedures can only be defined by careful consideration of use patterns and a knowledge of the pesticide's degradation characteristics in various segments of the environment. Analytical determinations should include the relative amounts of extractable (polar and nonpolar) and tissue-bound residues.

(iii) Modified fish exposure studies involving pesticides which are strongly adsorbed on soil surfaces will be considered on a case-by-case basis.

(iv) In addition to the fish residue studies discussed above, additional studies on fish and other aquatic organisms may be required under exposure conditions simulating their natural habitat. Also, additional residue studies on terrestrial wildlife may be required depending on the proposed use pattern.

(2) *Crop uptake studies.* Studies on the uptake of pesticide residues in soil will be required for pesticides with use patterns proposed for croplands, or for noncroplands that may be converted for crop use.

(d) *Photodegradation studies.* Photodegradation studies on the pesticide will be required on surfaces, in water, and in air depending on the nature of the compound and its use pattern. (See Appendix Part VI.)

(e) *Volatilization studies.* Studies demonstrating the rate of volatilization of the pesticide under typical conditions of use may be required. (See Appendix Part VI.)

(f) *Microbiological studies.*—(1) *Effect of pesticides on microorganisms.* Integrated pest control operations often require the application of several different pesticides to the same area within a short timeframe. One or more of these pesticides, on reaching the soil, could significantly reduce or eliminate populations of nontarget soil microorganisms and thereby alter the biochemical characteristics of the soil. The alterations could affect soil fertility, or the degradation of some of the pesticides and result in increased persistence of a pesticide. Thus tests on soil microorganisms or relevant enzyme systems of natural soil populations will be required to assess the overall action of a pesticide.

(2) *Effect of microorganisms on pesticides.* In general biodegradability is a major factor affecting the persistence of pesticides. In aquatic sites, where such conditions as turbid water or anaerobic environments may prevent other means of decomposition, such as photolysis or oxidation, biodegradation assumes even greater importance. Because biodegradation relies extensively on the action of microorganisms, a qualitative and quantitative assessment of their role in the degradation of all pesticides likely to enter aquatic environments in significant quantities will be required. These pesticides would include aquatic herbicides, household pesticides and industrial microbicides.

HAZARD EVALUATION

§ 162.80 Overview.

(a) The basic purpose of FIFRA, as amended, is to ensure that pesticides used in the United States perform their intended functions without causing unreasonable adverse effects on man or the environment. This part sets forth Guidelines for collecting and reporting toxicity data which an applicant for the registration or reregistration of a product registered prior to the effective date of this Part 162 (FIFRA section 3 Regulations) must provide to the EPA pursuant to § 162.8. The data on toxicity enables EPA:

(1) To determine whether registration should be approved and whether the pesticide product should be classified for general use or restricted use according to the criteria of § 162.11.

(2) To determine whether the proposed labeling contains adequate precautions and warnings to protect pesticide users, and exposed humans, domestic animals, fish, and wildlife.

(3) To establish residue tolerance to protect consumers of exposed foods.

(4) To determine conditions under which farm workers can enter treated fields.

Adverse effects resulting from pesticide use depends upon the degree of exposure as well as the degree of toxicity and the type of toxic effect. The physical and chemical nature of the pesticide and its metabolites and degradation products are important determinants of potential hazard. The data requirements contained in Chemistry are essential in evaluating the hazard posed by a pesticide. The following sets forth for an applicant the toxicological data and reporting guidance for pesticide registration.

(c) The Appendix to accompany Hazard Evaluation contains test protocols for experimentation which EPA has determined are adequate for developing data to determine the hazards posed by the use of a pesticide. To meet registration requirements, any test procedure used by an applicant must meet the intent and reliability of the test procedures contained in the Appendix and conform to these Guidelines. If the applicant plans to use a procedure which significantly deviates from the test procedures, the applicant should consult with EPA to determine if the changed procedure satisfies the requirements of Registration Division. In these Guidelines, data are identified as either basic and required for all pesticide registrations or conditional and required only under certain stated conditions. If an applicant contends that required data are not applicable to a specific product, he must submit a written statement to that effect and consult with EPA before embarking on a modified program of investigation. Data requirements set forth in these Guidelines and the Appendix will only be waived pursuant to § 162.8(a)(3), which provides:

> An applicant for registration may submit written evidence that the composition, degradability, proposed patterns of use and such other chemical or physical properties of a specific pesticide or product relating to an evaluation of the effects on the environment or man are fundamentally different from the considerations made by the Agency in the establishment of the data requirements of the Registration Guidelines and that therefore some or all of the data requirements of the Registration Guidelines are inapplicable to the specific pesticide or product. After considering the evidence submitted by the applicant, and such other information as may be available to him, the Administrator will make a written finding with respect to whether such properties of the specific pesticide or product are fundamentally different from the considerations made by the Agency in establishing the data requirements of the Registration Guidelines. If the Administrator determines that such properties of the specific pesticide or product are fundamentally different from the considerations made by the Agency, he may waive a data requirement specified in the Registration Guidelines when he determines that the data so required is not necessary in order for him to determine whether such specific pesticide or product will generally cause unreasonable adverse effects on the environment or man.

(d) The pesticide used for toxicological testing must be the same chemically characterized product which is proposed to be or is commercially produced and used. Tests must be conducted at intervals to check for stability of the substance tested. It may be necessary to require additional animal studies to those prescribed below, based on the slope of the resulting dosage-response curve, the severity and duration of toxic signs and other appropriate observed effects. See also § 162.8(d).

(e) All toxicological and hazard evaluation studies must be done under the direction of qualified personnel, who are responsible for utilizing sound scientific experimental procedures adequately to determine a pesticide's toxicological hazard. Nothing in this part shall be construed as relieving the pesticide developer and researcher of that responsibility.

§ 162.81 Hazards to humans and domestic animals.

(a) This section outlines, first, data requirements for all new registrations. For those pesticides which have been registered before October 21, 1974, and which must be reregistered and classified under the mandate of the amended FIFRA, data requirements are somewhat modified. They are enumerated in a second topic.

(b) Data requirements for new registrations. (1) The objective of acute toxicity testing is the demonstration of the lethal dose of a pesticide for 50 percent of an animal group, expressed as a LD-50 or LC-50, and identification of the toxic signs consequent to a single exposure. The results of these procedures are used to:

(i) Demonstrate comparative mortality risk for determining the proper labeling and classification for each pesticide use;

(ii) Delineate specific toxic manifestations and mechanisms;

(iii) Develop appropriate clinical management techniques for persons exposed to a hazardous dose either from accident or misuse of the pesticide;

(iv) Determine the need for additional hazard studies, such as long-term chronic studies;

(v) Design dosing regimens and other aspects of subacute and chronic studies; and

(vi) determine whether the pesticide is to be subject to a rebuttable presumption against registration or presumptively classified for restricted or general use according to § 162.11.

(2) When the LD-50 or LC-50 is reported, it must be accompanied with calculations of the slope of the dose-response line, together with 95 percent confidence intervals for the LD-50 or LC-50 and the slope. For an acceptable method of computing LD-50's and confidence intervals, see footnote 7.

(3) Basic tests.

(i) *Acute Oral LD-50*. The single dose oral LD-50 is to be established on the basis of tests using 1 mammalian species, preferably the rat. A complete description of effects observed, including full details of behavior changes and gross pathological findings at post-mortem, must be reported. Tests are to be performed with both the technical grade material and the formulated product. In addition, this test must be performed on the product as diluted for use if the pesticide is used in domestic situations. This information is important for determinations regarding the classification of pesticides. It is not of practical value to administer pesticide doses beyond 5000 mg/kg in the acute oral or dermal LD-50 test. If sufficient members of animals have been used to establish the absence of toxic manifestations at this level, higher doses are unnecessary.

(ii) *Acute Dermal LD-50*. The single dose dermal LD-50 is to be established on the basis of tests of at least 1 mammalian species. The rabbit is the animal of choice, but the guinea pig and rat are also acceptable. Tests are to be performed with the technical grade material and the formulated product. As in the oral LD-50 computation, all results must be completely reported. In addition to determining an LD-50 and systemic effects, a well designed and executed test can also be used to determine local dermatologic effects, thus eliminating the need for an additional primary dermal irritation test.

(iii) *Acute Primary Dermal Irritation*. Primary dermal irritation is to be evaluated with the technical grade material and the formulated product on at least 1 mammalian species. The rabbit is the animal of choice, but the guinea pig and rat are also acceptable.

(iv) *Acute Primary Eye Irritation*. Primary eye irritation is to be evaluated with the technical grade material and the formulated product on at least 1 mammalian species. The rabbit is acceptable for this test.

(4) Conditional Tests.

(i) *Acute*—(A) *Inhalation LC-50*. When the physical and chemical nature of the technical grade product or the formulated product under condition of use results in a respirable dust, mist, gas, or vapor, an inhalation LC-50 must be determined. Tests are to be conducted on 1 mammalian species. The rat is the animal of choice.

(B) *Other routes*. Intravenous or intraperitoneal routes of administration may, on occasion, be needed to resolve questions raised by the oral, dermal, or inhalation studies. For example, if the extent of the gastro-intestinal absorption of a pesticide is uncertain, the acute intraperitoneal and/or intravenous toxicity of the chemical in the same species that was used to evaluate the acute oral toxicity may be requested.

(ii) *Subacute tests*. Subacute toxicity procedures are designed to determine the adverse effects of multiple exposure within less than ½ the lifetime of the organism. Such test procedures may be utilized to determine the general toxicity resulting from multiple exposures, as is usually the case with subacute feeding procedures, or they may be utilized to evaluate the potential of a pesticide to elicit specific reactions.

(A) *Subacute dermal*. Skin sensitization and subacute dermal data will be required if conditions of use may result in repeated skin contact (through dusting or bathing pets, impregnation of fabrics or leather, direct application to livestock, use as a swimming pool additive or insect repellant, etc. The guinea pig is the animal of choice for skin sensitization studies; the rabbit, the animal of choice for subacute dermal data. Tests must be performed with the technical grade product and the formulated product. Photosensitization studies should be performed if conditions of use may result in repeated skin contact and exposure to sunlight with pesticide products that contain coal tar derivatives, pyridine, anthracene or other related chemicals that are known to elicit photosensitivity reactions.

(B) *Subacute inhalation*. Inhalation studies on the formulated product will be required if conditions of use may result in repeated inhalation exposure. At least 1 mammalian species must be used; the rat is the animal of choice.

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[7] Weil, C. S. 1952. Tables for convenient calculation of median effective dose and instructions in their use. *Biometrics*, 8: 249-263, or Litchfield, J. T. and Wilcoxon, E. 1949. A simplified method of evaluating dose-effect experiments. *Jour. Pharma. Exp. Therapy*. 96: 99-115.

(C) *Subacute oral.* Feeding studies will be required if use results in residues on food or feed or if significant oral exposure is expected, e.g. the swallowing of pesticides in swimming pool water. At least 2 mammalian species must be used, 1 a nonrodent, but excluding the rabbit.

(D) *Teratology.* Teratological studies are required on the technical grade product if the pesticide use may reasonable be expected to result in exposure to female humans, or if use may result in residues in food or feed. Teratological effects must be evaluated in tests using 1 mammalian species that possesses a hemochorial placenta, such as the rat, mouse, or non-human primate. Other species of proven value in this area, such as the dog, also may be used. In both this and reproduction studies, teratogenic effects must be distinguished from fetotoxic effects or generalized toxic effects on the parents.

(E) *Neurotoxicity.* Regardless of the route of exposure or the duration of the test, observations in experimental animals should be made for changes in behavior patterns, or other central nervous system effects. If the test compound is an organophosphate or carbamate pesticide or if it otherwise results in cholinesterase inhibition, neurotoxicity tests are required. The adult hen is acceptable for determining the effects of pesticides on the myelin sheath. The rat or dog is appropriate for demonstrating acetylcholinesterase inhibition.

(F) *Metabolism.* Metabolism studies are required if the pesticide use results in residues on food or feed. Depending upon the use and the nature of the residue on the raw agricultural commodities, 1 or 2 species should be studied. For example, if the pesticide is to be used in a manner likely to leave a residue in or on the feed of dairy cattle, the metabolism of the pesticide in the cow should be studied. Similarly, if the pesticide is to be used in a manner likely to leave residues in or on chicken feed, the metabolism of the pesticide in chickens should be studied. The rat and the dog are the usual laboratory species for extrapolating the metabolism of pesticides to man, however. The appendix provides information on testing pesticides in both ruminants and non-ruminants. Metabolism studies also may be required to define blood levels, tissue storage, detoxification mechanisms, or to resolve unusual toxicological problems.

(iii) *Chronic tests.* Chronic testing procedures determine the toxicological effects from multiple or continuous exposures over a period of at least ½ the lifetime of that organism. The purpose of these testing procedures is to establish a maximum exposure level that induces no toxicological effect and to determine the nature and degree of long-term toxic effects observed at various exposure levels.

(A) *Oncogenicity.* Oncogenic evaluation of the active ingredient will be required if the active ingredient(s), its metabolite(s), degradation product(s), or impurity(ies) contains a substance structurally related to a suspected or known oncogenic agent, produces hyperplasia or metaplasia; or if the pesticide use results in a residue on food or feed. Lifetime feeding studies are required in at least 2 mammalian species. The rat, mouse, and hamster are the animals of choice. One species used in the testing procedures must be the rat; the other species must be the most-sensitive species for that pesticide or chemical group, if such species has been established. For organochlorine pesticides, the mouse is the most-sensitive species and shall be the second species for testing. The most-sensitive species is generally determined in acute toxicity studies on a pesticide by pesticide basis; however, little information is available on most-sensitive species for lifetime feeding studies. As these species are identified, information will be provided in the Guidelines and Appendix.

(B) *Feeding.* Feeding studies are required if the pesticide use results in a residue on food or feed. At least 2 mammalian species must be used in these lifetime feeding evaluations. One species must be the rat; the other species will be determined by Registration Division. However, when a generally recognized most-sensitive species is appropriate for the particular pesticide, it will be prescribed. In most instances, life-time feeding studies also will provide data on oncogenicity that will be acceptable.

(C) *Reproduction.* Reproduction studies are required if the pesticide use results in a residue on food or feed. Evaluations must be performed on at least 1 mammalian species, using one of the same rodent species used in the feeding study. These studies will demonstrate whether abnormalities occur in parental activities from mating through lactation, and in progeny growth and development from inception through maturity.

(D) *Other Chronic Tests.* Experiments involving chronic exposures of experimental animals, usually via the oral route, shall also include observations of the effects of the pesticide on: (*1*) Hematopoiesis, (*2*) endocrine systems, and (*3*) histopathology of various tissues and organs, particularly the liver and kidney.

(iv) *Special Studies.* The following additional studies may be required under the special conditions indicated:

(A) *Mutagenicity.* Evaluation of the mutagenic potential of the active ingredients of a pesticide product will be required if the pesticide's use characteristics or chemical structure meet any of the following conditions:

(*1*) The pesticide requires a tolerance or an exemption from the requirement to obtain a tolerance;

(*2*) The active ingredient(s), its metabolite(s), degradation product(s) or impurity(ies) contains a substance structurally related to a suspected or known carcinogenic or mutagenic agent;

(*3*) The pesticide use pattern is likely to involve significant inhalation or dermal exposure to significant population groups.

The evaluation of mutagenic potential shall be conducted on *in vivo* mammalian test systems. The Appendix provides references on *in vivo* cytogenetics, a heritable translocation test and a specific locus test. The Agency realizes that, because of the special test animal and other requirements posed by these tests, they cannot be carried out by many laboratories at the present time. With current laboratory capacity, therefore, careful scheduling of mutagenic tests on mammalian test systems is necessary. The Agency believes, however, that in the near future when the demand for such tests becomes apparent, both academic and industrial laboratories will equip themselves to handle the workload. Government, academic and industrial researchers are also assessing the utility of tests on indicator organisms other than whole mammals for mutagenic evaluation and how they correlate with the mammalian experience. The Agency is closely following this assessment and, at the time when the reliability and effectiveness of nonmammalian tests have been established, will appropriately revise the requirements for mutagenic evaluation. During this evaluation phase, however, results of nonmammalian tests that indicate positive mutagenic potential may come to the attention of the Administrator. Such positive findings will not, in themselves, necessarily form the basis for a decision by the Administrator to deny the registration of a pesticide product. The Administrator will decide on a case-by-case basis whether the evidence warrants that a mutagenic or oncogenic evaluation be performed in mammalian test systems.

(B) *Potentiation.* If there is a reasonable possibility that the toxic effects of a pesticide could be potentiated by another chemical in the formulation or by another pesticide product with which it may be used, potentiation studies will be required.

(C) *Reentry.* Foliar residue and other studies measuring the exposure of persons reentering an area treated with pesticides will be required for cholinesterase inhibiting pesticides. These studies shall be designed to provide sufficient data to establish satisfactory precautionary statements. Characteristics of the pesticide which influence the requirement for reentry data include: (*1*) high acute toxicity by the oral, dermal, or inhalation routes of exposure, (*2*) long half-life of the chemical, taking into account volatility, so that it may be expected to be present in sufficient quantities to present a hazard to the worker when he enters the field, and (*3*) strong sensitizing activity in human or laboratory animals.

(D) *Other Studies.* When appropriate, additional studies based upon similarity of the chemical structure between the test compound and those known to produce specific toxic effects may be required. Studies may also be required to determine reversibility of effects found after subacute feeding.

(c) *Data requirements for reregistration.* If the toxicity testing data previously submitted to EPA conforms to the requirements of these Guidelines and § 162.8, no acute toxicity testing for evaluation of hazards to man are required for reregistering pesticides that are currently registered with EPA. The category of toxicity rating that has been assigned to each pesticide will be used for classification, under the provision of § 162.11, where additional toxicity testing is not required. The applicant for reregistration must submit or have submitted the following data as specified:

(1) Teratogenic evaluation of the technical grade product in a mammalian test system is required if the pesticide use may reasonably be expected to result in exposure to female humans or if use results in residues in food or feed.

(2) Oncogenic evaluation of the technical grade product will be required if: (i) The active ingredient(s), its metabolite(s), degradation product(s) or impurity(ies), contains within its structure a chemical moiety(ies) typically found in compounds which initiate oncogenesis in mammalian test systems; or (ii) the pesticide needs a tolerance or an exemption from the requirement to obtain a tolerance.

(3) If the technical grade product proves to be oncogenic in a mammalian test system and if the product is used in residences, or enclosed working spaces, or their immediate vicinity, a mutagenic evaluation may be requested.

(4) Chronic feeding studies will be required for pesticides which need a tolerance or an exemption from the requirement to obtain a tolerance; or pesticides for use in residences, working spaces, or their immediate vicinity. Such chronic feeding studies shall include studies of effects on the central nervous system and hematopoietic system, and historological changes in the liver, kidney, and reproductive systems (male and female).

(5) Reproduction studies will be required for pesticides which need a tolerance or an exemption from the requirement to obtain a tolerance. Such reproduction studies shall consist of three-generation investigations.

(6) Foliar residue and other studies measuring the exposure of persons reentering an area treated with pesticides will be required for cholinesterase inhibiting pesticides. These studies will be designed to provide sufficient data to establish satisfactory precautionary statements.

The animal species used to develop needed data for reregistration are the same as specified above for new registrations.

(d) *Data requirements for five-year renewal of registrations.* Under the provisions of section 6(a) of FIFRA as amended, a pesticide registration must be renewed at least every five years. Before the end of that period, the registrant must request that the registration be continued in effect. Pursuant to section 6(a) of the Act and § 162.6 governing the registration of pesticides, the registration shall be continued in effect only upon determination that the registration complies with all requirements of the Act, the current regulations, and guidelines promulgated thereunder. If new data requirements have been added for registration during the registration period, the registration will not be renewed unless the registrant has submitted such additional data to EPA. The Guidelines will be amended from time to time to reflect these additional data requirements.

§ 162.82 Hazards to fish and wildlife.

(a) Acute and subacute toxicities are the initial criteria by which potential hazard to fish and wildlife is evaluated. Data must be secured for all pesticides that will be used outdoors or that may contaminate water or other environmental resources. Data on the species listed below are normally sufficient for a general appraisal of the toxicity of pesticides to fish and wildlife.

(b) In evaluating the potential hazard posed by a proposed pesticide use, toxicity data will be considered together with such other factors as:

(1) The chemical and physical characteristics of the pesticide.

(2) The amount of pesticide applied per unit area and/or unit time.

(3) The likely degree of contamination of different environmental components under proposed conditions of use.

(4) The various species likely to be exposed to the pesticide.

(5) The routes by which organisms contact the pesticide and the likelihood of exposure in different components of the environment.

(6) The persistence of the pesticide or its biologically active metabolites and transferral between environmental components.

(7) The degree of bioaccumulation of the pesticide and/or its significant metabolites.

(c) *Data requirements for new registration.* The following data are required to evaluate the effects that a pesticide may have on the environment, particularly on fish and wildlife resources. All toxicity studies should investigate effects of several dosages or concentrations, ranging from an effect level to a nondiscernible-effect level. Proper statistical design and evaluation of any toxicity study is required. For acute and subacute toxicity tests, the results should be stated in terms of an LD–50 or LC–50. When the LD–50 or LC–50 is reported, it must be accompanied with calculations of the slope of the dose-response line, together with 95 percent confidence intervals for the LD–50 or LC–50 and the slope. The data provided will be used in all computations which determine whether the pesticide is subject to a rebuttal presumption against registration or is presumptively classified for restricted or general use. In addition to the quantified indices of lethality, other results, such as symptoms produced, also should be reported.

(1) *Basic tests*—(i) *Avian Acute Oral LD–50.* The single dose oral LD–50 of the technical grade material is required for 1 species of wild waterfowl, preferably the Mallard, or one of the following species of upland game bird: Bobwhite or other native quail, or the ring-necked pheasant.

(ii) *Avian Subacute Dietary LC–50.* The subacute dietary LC–50, 8-day protocol (5-day dietary exposure), of the technical grade material is required for 1 species of wild waterfowl and 1 species of upland game bird. Preferred species are those specified in paragraph (c)(1)(i) of this section. One of the 2 species selected for these studies must be the same species selected for the acute oral study required in paragraph (c)(1)(i) of this section.

(iii) *Fish Acute Toxicity.* Acute toxicity data (LC–50, 96-hr protocol) using the technical grade material are required for a cold-water and a warm-water fish. Similar data may also be required for certain formulated products depending on use patterns and other factors. The rainbow trout and the bluegill are preferred.

(iv) *Invertebrate Acute Toxicity.* Acute toxicity data (LC–50, 96-hr protocol) similar to that in paragraph C are required for a sensitive aquatic invertebrate, such as *Daphnia* sp.

(2) *Conditional tests*—(i) *Acute and subacute tests.* (A) Mammalian toxicity data as required for evaluating hazard to humans and domestic animals will normally be adequate to indicate hazard to wild mammals. Data on toxicity to livestock will be useful, if available.

(B) Acute toxicity data (LC–50, 96-hr protocol) using either the technical grade material, the formulated product, or both are required for shrimp and crabs if the pesticide will be used in, or may contaminate, estuarine or marine environments.

(C) Acute toxicity data for oyster larvae (LC–50, 96-hr protocol) or shell deposition data for a representative marine mollusc, such as the American oyster, are required, using either the technical grade material, the formulated product, or both, if the pesticide will be used in, or may contaminate, estuarine or marine environments.

(D) Satisfactory evidence is required that, under conditions of proposed use, the pesticide or specified formulations will not cause unreasonable adverse effects on the flora and fauna in aquatic environments, including those of the water column and bottom sediments. Because of the complexity of aquatic ecosystems, specific requirements will be established on a case-by-case basis. Toxicity and residue studies may be required using a typical bottom-feeding species (channel catfish or carp); predator fishes representative of cold and warm water habitats (bass, bluegill, northern pike or walleye, and brook or rainbow trout); molluscs (oysters or freshwater clams); Crustaceans (Daphnia, Gammarus, or crayfish); and insect larvae (midges) or nymphs (mayfly).

(ii) *Chronic Tests.* (A) Reproduction studies on Bobwhite and Mallard normally will be required for materials which are persistent, are stored, or accumulate in plant or animal tissues, or are used under conditions where wild birds may be subjected to repeated or continued exposure.

(B) Subacute or chronic fish and/or invertebrate reproduction studies normally will be required if the pesticide is to be used in, or is likely to contaminate, aquatic environments. Judgement on the necessity for these studies will take into consideration the expected persistence of the pesticide in soil and the aquatic environment, its propensity for bioaccumulation, and use patterns.

(iii) *Special Studies.* (A) Potential hazards relating to a proposed pattern of use may require special testing under actual or simulated field conditions.

(B) Toxicity data beyond those outlined here may be requested on an individual basis and will be specific to the problem.

(C) See Petitions for Tolerances for the data requirements to establish a tolerance or an exemption from the requirement for a tolerance, where a pesticide use may result in residues in fish or shellfish.

(d) *Data requirements for reregistration.* The minimum data requirements for reregistration and classification of outdoor pesticide uses include the avian subacute dietary LC–50 and the 96–hr LC–50 for fish and other aquatic organisms. If these data have been submitted previously, they need not be developed again. Additional studies may be required if a registered pesticide use has demonstrated hazard to fish and/or wildlife—for example, any verified accidental kill of nontarget organisms.

PETITIONS FOR TOLERANCES

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GUIDELINES FOR REGISTERING PESTICIDES IN THE UNITED STATES

APPENDIX

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PART I. SCOPE AND INTENT OF APPENDIX

Although, because of bulk, the Appendix to the Guidelines for Registering Pesticides in the United States has been compiled separately from the guidelines, the two are complementary documents. For an integral treatment of a topic, the user should consult both documents: the guidelines primarily explain what the procedural and data requirements for registration are; the appendix delineates how these requirements may be acceptably satisfied.

To facilitate reference between corresponding parts and topics, the appendix is divided into the same major parts as the guidelines. Because many subjects are treated more extensively in the appendix, some of the parts are divided into subparts. Parts presently designated "reserved" will, as the appendix is progressively developed, comprise procedural exhibits, such as data submission forms, and other material that may assist a registrant in compiling data or in completing accurate application packages.

This initial publication of the appendix describes those test methods, procedures, or protocols related to developing registration data for: (1) Product efficacy; (2) environmental chemistry; and (3) hazards to humans and domestic animals and fish and wildlife. Because of the diversity of the materials, the information is presented in several formats:

Bibliographic citations only, where material cited is available in open literature and the method or protocol is acceptable precisely as presented.

Annotated bibliographic citations, where a modification, adaptation, or explanatory statement is necessary for acceptable data development for registration.

Full text (with source credit) of unpublished methods or protocols or those that are not readily available.

Full text of procedures compiled from several sources, authorities, or references.

The appendix is not intended to set standard test methods or prescribe inflexible registration requirements. Accordingly, methods, procedures, and protocols described or referenced are those presently considered adequate for developing data acceptable for registration purposes, or those that can be identified as sources of information within the present state of the art. The Agency recognizes that applicants may be aware of other test procedures which are equally effective for particular purposes and that new procedures will be developed in the future. It also recognizes that the test methods described sometimes may not be well suited to the evaluation of particular products. Thus, modification of the specific procedures set out in the appendix is permissible, providing the intent and reliability of the suggested methods are met. In cases where an applicant proposes to deviate from the procedures suggested, prior agreement with the Agency on the specific data development methods to be employed is strongly recommended.

Neither the guidelines nor the appendix are static documents. They will be expanded and revised periodically to reflect new scientific knowledge, new trends in pesticide development, and new Agency policies. All applicants, and new applicants in particular, are encouraged to consult with the Office of Pesticide Programs to resolve any questions relating to data requirements or data development. Any applicant who considers that certain provisions of the guidelines or the appendix may not be appropriate for a particular pesticide should submit a written statement of his position and consult with the Office to determine what data are necessary in his particular case.

In the course of preparing this appendix, the Agency has actively sought the advice of such distinguished professional groups as the American Institute of Biological Sciences, the Association of Official Analytical Chemists, the Chemical Specialties Manufacturers Association, and the American Society for Testing and Materials.

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  Mycobacterium tuberculosis IV.A–31

PART IV—PRODUCT PERFORMANCE

SUBPART A—ANTIMICROBIAL AGENTS

This section considers antimicrobial agents, primarily efficacy data requirements for supporting labeling claims, and areas in which products are used. The applicant should assure himself that the test method selected to substantiate efficacy is current and applicable to the product proposed for registration.

Efficacy data requirements for registration are designed to provide:

1. Some evidence that the applicant can reproduce the product formula so that each production batch will have the same level of activity.

2. Evidence that the formula which is being offered for sale will have reasonable shelflife.

3. A sufficient volume of testing so that product deficiencies which may be subsequently found on enforcement samples in

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[1] More detailed Contents pages precede each part or subpart.

[2] More detailed Contents pages precede each Subpart.

laboratories cannot be ascribed to variations in testing methodology that may be utilized among different laboratories.

Reference to "batches" in this subpart means individually formulated preparations of the product, either in the laboratory or from production.

STERILIZERS

Horowitz, William, ed. 1970. Sporicidal test—official final action. Pages 64–65 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Since "sterilizer" is an absolute term (to destroy all living things), the data required to support a sterilizing claim are greater than those required to support a sporicidal claim. The test requires 30 replicates on each of 2 kinds of carriers (porcelain penicylinders and surgical silk suture loops) against spores of both *Bacillus subtilis* and *Clostridium sporogenes* on 3 different batches (total of 120 carriers on each batch). Thirty carriers of each type must also be tested against spores of *B. subtilis* and *C. sporogenes* on duplicate samples of 1 batch aged to represent a 60-day shelflife stability study (total of 240 carriers, plus 360 carriers equals 600 carriers). No growth must be observed in any of the subculture or resubculture tubes from the 600 carriers.

SPORICIDES

Horowitz, William, ed. 1970. Sporicidal test—official final action. Pages 64–65 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

The AOAC Sporicidal Test requires 30 replicates on each of 2 kinds of carriers (porcelain penicylinders and surgical silk suture loops) against spores of both *Bacillus subtilis* and *Clostridium sporogenes* on 3 different batches (total of 120 carriers on each batch). Thirty carriers of each type must also be tested against spores of either microorganism on duplicate samples of 1 of the 3 batches, aged to represent a 60-day shelflife stability (total of 120 carriers for the stability test). Added claims for effectiveness against sporeforming organisms other than *B. subtilis* and *C. sporogenes* must be substantiated with data derived from 30 replicates (porcelain penicylinders) on 1 batch. The spores must be inactivated in 30 out of 30 trials at the dilution and exposure time specified. For a statistical confidence level of 95 percent, killing in at least 59 out of 60 trials is required.

VIRUCIDES

(Tentative method prepared by Registration Division, Office of Pesticide Programs, EPA, 1972)

Because no specific official standardized method for evaluating the virucidal activity of disinfectants has been adopted, EPA will accept adequate data developed by any virological technique which is recognized as technically sound. The procedure employed must simulate actual in-use conditions. For this reason, acceptable virological data are usually developed by carrier methods which are modifications of either the AOAC Use-Dilution Method (for liquid surface disinfectants) or the AOAC Germicidal Spray Test (for spray surface disinfectants). To simulate in-use conditions, the specific virus to be tested must be inoculated onto hard surfaces, allowed to dry, and then treated with the product according to the directions for use on the product label. The treated surfaces must be assayed after a 10-min exposure to determine if the virus has been inactivated. Since most germicidal chemicals are inherently toxic for the host systems employed in virological techniques (especially cell cultures), either a "detoxification" procedure, which will render the treated virus free of residual germicide, or a virus concentration of sufficient titer to demonstrate at least a 3-log reduction, even when cytotoxicity is observed in tissue culture systems, must be employed in the study.

The following information must be provided on each test:

1. The dilutions employed in the recovery of the virus film from the surface: e.g., 10^{-1} 10^{-2}, etc.
2. Virus controls: surfaces contaminated with the test virus; no germicide used; virus recovered at various dilutions in assay system (tissue culture, embryonated egg, mouse injection, etc.).
3. The activity of the germicide on a minimum of 5 separate surfaces (e.g., glass slides) contaminated with the test virus, showing recovery at various dilutions in assay system.
4. Cytotoxicity controls: germicide on surfaces without test virus; effect on assay system.
5. The ID-50 values calculated in the various tests.
6. The reduction of the virus titer by the activity of the germicide ID-50/ml of the virus control less the ID-50/ml of the test system, expressed as Log$_{10}$ and calculated by a statistical method (Reed and Muench, 1938; Litchfield and Wilcoxan, 1949, as examples).

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A typical laboratory report of a single test with 1 virus involving a tissue culture, therefore, would include the details of the methods employed together with a table such as the following:

Dilution of virus from surface	Virus-germicide (recovery [1] of virus from treated surface)	Virus-control recovery [1] of virus from untreated surface)	Cytotoxicity-control (Toxic effect of germicide; no virus)
10^{-1}	T T T T T	+ + + + +	T T T T T
10^{-2}	T T T T T	+ + + + +	T T T T T
10^{-3}	T T T T T	+ + + + +	T T T T T
10^{-4}	T T T T T	+ + + + +	T T T T T
10^{-5}	T T T 0 0	+ + + + +	T T T T T
10^{-6}	0 0 0 0 0	+ + + + +	0 0 0 0 0
10^{-7}	0 0 0 0 0	+ + + + +	0 0 0 0 0
10^{-8}	0 0 0 0 0	+ + + + +	0 0 0 0 0
10^{-9}	0 0 0 0 0	+ 0 0 0 0	0 0 0 0 0

[1] Demonstrated by cytopathogenic effect, fluorescent antibody, plaque count, animal response, or other recognized acceptable technique.

NOTE.—T=toxic; +=virus recovered; 0=no virus recovered.

Claims of virucidal activity for a product must be restricted to those viruses which have actually been tested. Duplicate studies on one sample of the product are required for each virus tested. When cytotoxicity is evident (as in above table) at least a 3-log reduction in titer must be demonstrated. The virucide must demonstrate complete inactivation of the virus at all dilutions.

Where the test virus does not demonstrate measurable cytopathogenic reactions in subculture growth systems, *in vitro* testing would be considered presumptive. In this case, confirmatory testing *in vivo* must be carried out in a susceptible host after exposure of the virus to the disinfectant.

References

Litchfield, J. T., Jr., and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect experiments. *Jour. Pharma. Exp. Therapy*, 96: 99–115.

Reed, L. J., and H. Muench. 1938. A simple method of estimating 50 percent end-points. *Amer. Jour. Hygiene*. 27: 493–497.

DISINFECTANTS—HOSPITALS AND RELATED INSTITUTIONS (LIQUID PRODUCTS)

Horowitz, William, ed. 1970. Use-dilution method—official final action. Pages 61–64 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

With products recommended for disinfection in hospitals, clinics, dental offices, etc., 60 replicates are required on each of 3 samples, representing 3 different batches, against Staphyloccus aureus. Thirty replicates on each of these 3 samples are also required against Salmonella choleraesuis and Pseudomonas aeruginosa. One of these batches, aged to represent a 60-day shelflife stability study, must also be tested with 30 replicates on duplicate samples against S. aureus. The product must be effective in disinfecting 59 out of each set of 60 replicates to provide a 95 percent confidence level of effectiveness as required by EPA. However, where only 30 replicates are required, the product must be effective in disinfecting each set of 30 replicates.

DISINFECTANTS—HOSPITALS AND RELATED INSTITUTIONS (SPRAY PRODUCTS)

Horowitz, William, ed. 1970. Germicidal spray products—official final action. Pages C8–71 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

With products recommended for disinfection in hospitals, clinics, dental offices, etc., 60 replicates are required on each of 3 samples, representing 3 different batches, against *Staphylococcus aureus*. Thirty replicates on each of these 3 samples are also required against *Salmonella choleraesuis* and *Pseudomonas aeruginosa*. One of these batches, aged to represent a 60-day shelf life stability study, must also be tested with 30 replicates on duplicate samples against *S. aureus*. The product must be effective in disinfecting 59 out of each set of 60 replicates to provide a 95 percent confidence level of effectiveness as required by EPA. However, where only 30 replicates are required, the product must be effective in disinfecting each set of 30 replicates.

DISINFECTANTS—HOUSEHOLD AND NONMEDICAL INSTITUTIONS (LIQUID PRODUCTS)

Horowitz, William, ed. 1970. Use-dilution method—official final action. Pages 61–64 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

EPA requires 60 replicates on each of 3 samples, representing 3 different batches, against *Salmonella choleraesuis*. In addition, 30 replicates on each of these 3 samples against *Staphylococcus aureus* and 1 other pathogen exclusive of *S. aureus*, *Salmonella typhosa* and *S. choleraesuis* must be tested. Data must be developed to show that the other pathogen tested will survive the carrier drying step utilized in the referenced tests. One of these batches, aged to represent a 60-day shelf-life stability study, must also be tested with 30 replicates on duplicate samples against *S. choleraesuis*. The test methods and confidence level requirements are the same as those described for hospitals and related institutions.

Some manufacturers make disinfectant claims for their abrasive kitchen cleaning products. When a disinfectant claim is made, the same data as above is required when the product is tested at 1 part of product to 2 parts of water. In this test, a slurry results; it is allowed to settle, and the test is conducted on the supernatant.

DISINFECTANTS—HOUSEHOLD AND NONMEDICAL INSTITUTIONS (SPRAY PRODUCTS)

Horowitz, William, ed. 1970. Germicidal spray products—official final action. Pages 68–71 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

EPA requires 60 replicates on each of 3 samples, representing 3 different batches, against *Salmonella choleraesuis*. In addition, 30 replicates on each of these 3 samples against *Staphylococcus aureus* and 1 other pathogen exclusive of *S. aureus*, *Salmonella typhosa* and *S. choleraesuis* must be tested. Data must be developed to show that the other pathogen tested will survive the carrier drying step of the referenced test. One of these batches, aged to represent a 60-day shelflife stability study, must also be tested with 30 replicates on duplicate samples against *S. choleraesuis*. The test methods and confidence level requirements are the same as those described for hospitals and related institutions.

MINIMAL DISINFECTANT CLAIMS (LIQUID PRODUCTS)

Horowitz, William, ed. 1970. Use-dilution method—official final action. Pages 61–64 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Minimal disinfectant claims are limited to situations where it is primarily important to achieve effectiveness against Gram negative enteric bacteria. These claims are allowed on products that are recommended for the disinfection of toilet bowls and urinals. Required are 60 replicates on each of 3 samples, representing 3 different batches against *Salmonella choleraesuis*. One of these batches, aged to represent a 60-day shelflife stability study, must also be tested with 30 replicates on duplicate samples against *S. choleraesuis*. The confidence level requirements are the same as those described for institutional disinfectants.

MINIMAL DISINFECTANT CLAIMS (SPRAY PRODUCTS)

Horowitz, William, ed. 1970. Germicidal spray products—official final action. Pages 68–71 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Minimal disinfectants claims are limited to situations where it is primarily important to achieve effectiveness against Gram negative enteric bacteria. These claims are allowed on products that are recommended for the disinfection of toilet bowls and urinals. Required are 60 replicates on each of 3 samples, representing 3 different batches against *Salmonella choleraesuis*. One of these batches, aged to represent a 60-day shelflife stability study, must also be tested with 30 replicates on duplicate samples against *S. choleraesuis*. The confidence level requirements are the same as those described for institutional disinfectants.

DISINFECTANT CLAIMS AGAINST OTHER MICROORGANISMS (LIQUID PRODUCTS)

Horowitz, William, ed. 1970. Use-dilution—official final action. Pages 61–64 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Offical Analytical Chemists, Washington, D.C.

Claims for effectiveness against specific microorganisms other than those named in the AOAC Use-Dilution Method can be accepted only when supported by efficacy data derived from 10 replicates on 1 batch against each microorganism claimed. The product must be effective in disinfecting each set of 10 replicates. Data must be developed to show that the other microorganisms tested will survive the carrier drying step utilized in the referenced tests.

DISINFECTANT CLAIMS AGAINST OTHER MICROORGANISMS (SPRAY PRODUCTS)

Horowitz, William, ed. 1970. Germicidal spray products—official final action. Pages 68–71 in Official Methods of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Claims for effectiveness against specific microorganisms other than those named in AOAC Germicidal Spray Products Method can be accepted only when supported by efficacy data derived from 10 replicates on 1 batch against each microorganism claimed. The product must be effective in disinfecting each set of 10 replicates. Data must be developed to show that the other microorganisms tested will survive the carrier drying step utilized in the referenced test.

FUNGICIDES (PATHOGENIC TO MAN AND ANIMALS)

Horowitz, William, ed. 1970. Fungicidal tests—official final action. Pages 65–66 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Claims against specific pathogenic fungi must be supported with efficacy data derived from duplicate samples of 1 batch using the AOAC Fungicidal Test. The highest dilution that kills the fungal spores within 10 min is considered the highest dilution that could be expected to disinfect inanimate surfaces contaminated with pathogenic fungi.

SANITIZING RINSES (HALOGENS)

Horowitz, William, ed. 1970. Available chlorine germicidal equivalent concentration—official final action. Pages 63–64 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Sanitizing rinse claims for iodophors, mixed halides and chlorine-bearing chemicals must be substantiated with efficacy data derived by the Available Chlorine Germicidal Equivalent Concentration Method. Data from 1 test on each of 3 samples representing 3 different batches, showing the concentrations of the product equivalent in activity to the reference standards of 50, 100 and 200 ppm of available chlorine as sodium hypochlorite, against *Salmonella typhosa* are required. Data from duplicate samples of 1 of these batches, representing a 60-day shelflife stability study, showing concentrations of the product equivalent in activity to the 3 reference standards must be furnished. Chemical analyses may be substituted for biological testing on the 60-day sample.

SANITIZING RINSES—FOOD CONTACT SURFACES (APPLICABLE CHLORINE GERMICIDAL EQUIVALENT CONCENTRATION NOT AVAILABLE)

Horowitz, William, ed. 1970. Germicidal and detergent sanitizers—official final action. Pages 66–68 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Sanitizing rinse claims for quaternary ammonium compounds, chlorinated trisodium phosphate and anionic detergent-acid formulations must be substantiated with efficacy data derived by the AOAC Germicidal and Detergent Sanitizers Method. Data from 1 test on each of 3 different batches against both Escherichia coli and Staphylococcus aureus are required, along with data from duplicate samples of 1 of these batches representing a 60-day shelflife stability study against E. coli. When claims for the effectiveness of the product in hard water are made, data derived from tests on duplicate samples of 1 batch against both E. coli and S. aureus are required at the hard water tolerance claimed. The efficacy data must show a 99.999 percent reduction in the count of number of organisms within 30 sec for a product to be acceptable as a sanitizing rinse.

SANITIZING RINSES—NONFOOD CONTACT SURFACES (PREPARED BY REGISTRATION DIVISION, OFFICE OF PESTICIDE PROGRAMS, EPA, 1972)

To substantiate the sanitizing claims for a product, the applicant must submit data prior to registration to show that the product, when used as directed, will substantially reduce the numbers of test microorganisms on a treated surface over that on an untreated control surface. The following protocol may be utilized:

Product samples representing 3 different preparations must be tested against each test bacterium on each representative surface depending on the uses proposed on the label. In addition, 1 sample preparation representing a 60-day shelflife stability study must be tested in duplicate using 1 test bacterium. The test microorganisms may be *Staphylococcus aureus* ATCC 6538 and *Klebsiella pneumoniae*, aberrant, ATCC 4352; *Enterobacter aerogenes* ATCC 13048 may be substituted for *K. pneumoniae*. Representative test surfaces may include, but are not limited to, glass, metal, unglazed or glazed ceramic tile, or vitreous china. The propagation of cultures and the use of subculture media and other related equipment should be as specified in sec. 4.001 and 4.002 of the current AOAC Manual of Methods, 1970.

Determine the count of bacteria in an 18- to 24-hr broth culture and add a 0.01 to 0.03 ml quantity of the broth culture by spreading on 1 x 1 in. sq of test surface using a bacteriological loop. The squares should be dried for 20-to-30 min in a bacteriological incubator at 30 to 37°C. A "zero time" bacterial numbers recovery test must be performed to show the efficiency of the recovery process and must be reported. The "zero time" test should show the loss in viability that occurred during the drying. Apply the product to the test surface as directed on the label. Run parallel tests on the formulation with active ingredient(s) omitted in an identical manner to serve as the controls. After a suitable time interval, recover test organisms by washing the squares with adequate agitation in appropriate media or diluting fluid containing appropriate neutralizers. Make plate counts on appropriate nutrient agar containing the same neutralizers by the pour or spread plate technique. Exposure time intervals between zero time and 10 min should be tested for the product as well as for the untreated controls.

The results must show a bacterial reduction of at least 99.9 percent over the parallel control count within 5 min. Three replicates of each test surface with each test microorganism must be tested against each sample for a total of 9 determinations with each bacterium. The 60-day shelflife study should be carried out with 2 replicates of each test surface against 1 test bacterium.

Reference

Horowitz, William, ed. 1970. Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

RUG AND CARPET SANITIZERS OF BACTERIOSTATS (TENTATIVE METHOD PREPARED BY REGISTRATION DIVISION, OFFICE OF PESTICIDE PROGRAMS, EPA, 1971)

Equipment—1. *Carpet mounting board.* Mount a piece of ⅛-in. tempered hardboard, with tempered surface up, on a 16 x 16-in. base of ¾-in. thick marine plywood, with ¾-in. brads.

2. *Cutting equipment.* 2 x 2-in. sq of ¼-in. acrylic plastic as templates with 5/32-in. holes in the center and 1 sharp knife with a replaceable blade.

3. *Scrub brushes.* 1¼ x 3½-in. surgical hand brush with ⅝-in. nylon bristles.

4. *Extraction bottles.* 8-oz, widemouth, round polypropylene bottles with screw caps (Nalgene 2105 or equivalent) containing 10 stainless steel penicillin cylinders and 100 ml of appropriate neutralizer broth. (Similar style glass bottles may be used, but care must be taken to prevent breakage during shaking.) For phenolic based carpet sanitizers, use AOAC nutrient broth with double strength letheen neutralizer (AOAC letheen broth plus an additional 0.7 g Lecithin and 5 g Tween 80 per liter.)

5. *Spray device.* Adjustable spray atomizer modified to feed from a calibrated test tube or bottle. (A Model 15, DeVilbiss atomizer on a 2-oz bottle graduated with 10 ml marks may be used.)

6. *Carpet.* See "Special Registration Protocol."

Test Cultures and Media—1. *Test bacteria. Staphylococcus aureus*, ATCC 6538, and *Enterobacter aerogenes*, ATCC 13048.

2. *Double strength neutralizer broth.* AOAC letheen broth with an additional 0.7 g Lecithin and 5 g Tween 80 per liter or 0.1 percent sodium thioglycollate and 0.01 percent isooctylphenoxypolyethoxyethanol in pH 7.2 phosphate buffer.

3. *Neutralizer plate count agar.* Standard methods agar (Tryptone Glucose Extract Agar) to which is added 0.7 Lecithin and 5 g Tween 80 per liter.

Bacterial Inoculum. Prepare 8-oz French square culture bottles with nutrient agar b (AOAC, 1970, sec. 4.023(a), (2)). Prepare culture suspensions for inoculation (AOAC, 1970, sec. 4.026). Dilute the standardized suspension in phosphate buffer dilution water to obtain a stock inoculum suspension containing 10 x 10^9 organisms peruml (AOAC, 1970, sec. 4.023(f)).

Procedure. 1. Cut the carpet into 8 x 12-in. pieces and, with aid of 2 x 2-in. template, cut 2 rows of 3 squares per row from the backing side of the carpet leaving at least 4 in. between the center of each square. The test squares may be completely cut free, or a preferred method is to leave about ⅛ of an in. of backing intact at each corner of each cut square so that the entire piece of carpeting can be sterilized and inoculated without separation. Mark in the center of each test square with a waterproof marking pen to aid in inoculating the pile surfaces. Cover surface of carpeting with aluminum foil and fold over edges to secure. Steam-sterilize and dry. Foil will prevent contamination of controls during spraying. Only carpet that has been determined to be free of residual antimicrobials on the pile or backing surfaces, following autoclaving by a zone of inhibition overlay technique, should be used.

2. Prepare a standardized stock bacterial suspension by washing the 24 hr growth from nutrient agar b bottles and adjust to a density of 10 x 10^9 organisms per ml with phosphate buffer. Dilute the stock suspension with phosphate buffer containing 0.01 percent isooctylphenoxypolyethoxyethanol to a concentration of 1.0 x 10^7 organisms per ml. Inoculate the previously marked center of each square with 0.1 ml of bacterial suspension. (Retain bacterial suspension for determination of inoculation numbers.) Dry inoculated carpet in a warm incubator at 36° C for 60 min with the foil wrap loosely in place. The scrubbing procedure should be conducted in a biological hood or in a glove box. A simple safety chamber can be constructed from a large plastic bag.

3. Condition brushes by immersing the bristles in separate containers (150-mm glass petri dishes or equivalent) of diluted test solution and a control solution without the active agent for 15 min. (If a control solution is not available, use sterile distilled water containing 0.01 percent isooctylphenoxypolyethoxyethanol.) Fasten 2 pieces of inoculated carpet containing 12 test squares onto a mounting board by nailing each corner with upholsterer's tacks with the foil wrapping positioned so as to protect the controls during the scrubbing treatment. Place board in a safety hood.

4. Apply the portion of the predetermined amount of test solution at a temperature of 25° C uniformly to 1 piece of carpeting containing 6 spots of dried bacterial inoculum. Apply liquids by metered spray. The hand brush dipped into the solution no more than 6 times will deliver about 15 ml of solution. Do not exceed this amount. Spray liquid on rug in the amount over and above 15 ml needed to yield a 99.9 percent reduction or in the amount that equals the recommended liquid application rate per square area of rug. Record the total volume of liquid applied by spray and brush. Solids may be applied by dusting. In this case, record the weight of product applied. Shake excess test solution from conditioned brush and transfer to a dish containing 100 ml of test solution. Dip bristles of brush and transfer amount of retained test solution to a spot on the carpet. Scrub the spot for 30 sec. using 30 circular clockwise strokes and 30 circular counterclockwise strokes. A circular area of pile approximately 3 in. in diameter around each spot should be covered by this treatment. Moderate to heavy pressure should be applied downward on the brush to work the solution to the base of the pile. Repeat dipping of brush into test solution and scrubbing procedure until each of the 6 spots is treated. Allow the treated carpet to remain at room temperature for 60 min. for partial drying of treated areas.

5. While the carpet treated with test solution is drying, spray on an amount of nonactive control solution equivalent to the surface area onto 3 of the spots of dried inoculum on the control carpet. The remaining 3 spots are unscrubbed controls to determine reduction in inoculation numbers due to drying. Care should be taken not to wet or scrub over the unscrubbed control area. Scrub the 3 wet spots in the same manner as test carpet. Allow the scrubbed controls to dry 60 min. at room conditions as for test pieces.

6. Following the 60-min. reaction period, cut each 2 x 2-in. test piece free with flamed forceps and knife. Transfer each 2 x 2-in. piece of carpeting to a separate extraction bottle of neutralizer broth. Shake each extraction bottle vigorously for a minimum of 1 min. to free viable organisms from the carpet fibers. Determine the number of viable organisms in each sample bottle by plating duplicate dilutions in standard methods agar with appropriate neutralizer. Determine the number of viable organisms in 0.1 ml of the bacterial suspension used for inoculating the carpet. Incubate all broth extraction bottles to determine germicidal or incomplete neutralization of the test carpet.

7. Determine the percent reduction of viable organisms by the treatment method by comparing the number of surviving organisms of the treated sample against the average viable count of the scrubbed control sample. A count of 1.0 x 10^4 organisms per ml from the extracted unscrubbed control spots is necessary for a valid test.

Special Registration Protocols. The following protocols must be used to derive data to support the registration of a carpet sanitizer.

1. Three product samples representing 3 separate preparations must be tested against each of the 2 bacteria specified in the method with 2 different types of carpet. A 99.9 percent reduction of test bacteria over the control count must be demonstrated in each case. If the product is intended for use on commercial grade carpeting, 2 representative carpets such as "acrylic" and "polypropylene" tufted-loop type may be tested. No carpeting is available to serve as a standard. If the product is intended for use on wool carpeting, an additional representative sample must be tested. If not, the label must bear a disclaimer for such use. All carpet samples tested must be fully identified, and the pile fiber type, pile yarn weight of finished carpet, pile density and tuft height reported. Adequate controls must demonstrate that bacteriostatic agents in the carpet pile or backing do not interfere with the test results.

2. One sample preparation representing a 60-day shelflife stability study must be tested with 1 carpet sample and 1 test bacterium.

The amount of sanitizer applied to a piece of carpet must be extrapolated to gallons of diluted shampoo to square feet of carpet and this must be declared on the proposed label. In general this would be 12 gal of dilute product to 800 to 1200 sq ft of carpet. If the application is intended for hospitals, a wet vacuum pickup must be specified in the label directions. In no case will the so-called "dry shampoo treatment" be considered for hospital use.

Reference

Horowitz, William, ed. 1970. Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

SANITIZERS—FABRICS AND TEXTILES

Petrocci, A. N., and Paul Clarke. 1969. Proposed test method for antimicrobial additives. J. AOAC 52: 836–842.

For products bearing sanitizing claims, the method of Petrocci and Clarke may be employed to provide efficacy data to support registration, since no official test method is available. The test may be carried out in a washing machine in lieu of the Petrocci and Clarke method. However, if a washing machine is used the general protocols, propagation of cultures, fabric to water ratios, test materials, water temperatures and subculture media must be the same as specified in the Petrocci and Clarke method.

The test organisms are klebsiella pneumoniae, ATCC 4352 and Staphylococcus aureus, ATCC 6538. Tests must be conducted with 3 samples representing 3 product preparations, each sample tested with 3 replicate fabric swatches against the 2 test organisms specified. One sample representing a 60-day shelflife stability study must be tested in duplicate against S. aureus. A 99.9 percent reduction within 10 min must be demonstrated over the control counts.

AIR SANITIZERS AND DEODORIZERS (TENTATIVE METHOD PREPARED BY REGISTRATION DIVISION, OFFICE OF PESTICIDE PROGRAMS, EPA, 1972)

No standard method for evaluating air sanitizer claims has been adopted. Several investigators have shown that the incorporation of glycols (triethylene, propylene or dipropylene glycol) in pressurized formulations at concentrations of 5-to-10 percent significantly reduce airborne bacteria when adequate vapor concentrations are achieved. Air sanitizing products that do not contain such concentrations of glycols must be evaluated by a room or chamber technique. The primary test organism is *Staphylococcus aureus*. Depending on the intended use pattern, other organisms, such as *Salmonella* or *Pseudomonas*, may also be used to provide efficacy data. The results must show a bacterial reduction of at least 99.9 percent over the parallel control count within 5 min.

SELF-SANITIZERS

(Tentative method prepared by Registration Division, Office of Pesticide Programs, EPA, 1972)

To substantiate self-sanitizing claims for a product, the applicant must submit data prior to registration to show that the product when used as directed will substantially reduce the numbers of test microorganisms on treated representative surfaces when compared to the numbers of microorganisms on control surfaces which have been treated with the same product without the active ingredient.

Three product samples representing 3 different preparations must be tested against each test bacterium on at least 5 replicates of each representative surface for which the product is intended for use. In addition, 1 sample preparation representing a 60-day shelflife stability study must be tested in duplicate using 1 test bacterium on at least 5 replicates of each representative surface to be treated. The test microorganisms may be *Staphylococcus aureus*, ATCC 6538, and *Klebsiella pneumoniae*, aberrant, ATCC 4352; *Enterobacter aerogenes*, ATCC 13048, may be substituted for *K. pneumoniae*. Representative test surfaces may include, but are not limited to, glass, metal, unglazed or glazed ceramic title, vitreous china, or wooden flooring depending on the uses proposed on the labels. The propagation of cultures and the use of subculture media and other related equipment should be as specified in sec. 4.001 and 4.002 of the current AOAC Manual of Methods.

Apply the product to the control and test surfaces as directed on the label, allowing for complete drying of the surfaces. Determine the count of bacteria in a 48-hr broth culture and add a 0.01 to 0.03 ml quantity of the broth culture by spreading on 1 x 1 in. sq of each test surface using a bacteriological loop. The squares should be dried for 20-to-30 min in a bacteriological incubator at 30 to 37°C. A "zero time" bacterial numbers recovery test must be performed to show the efficiency of the recovery process and must be reported. The "zero time" test should show the loss in viability that occurred during the drying. A minimum count of 1×10^4 organisms per test surface must be recovered after drying for the test to be considered valid.

After a suitable time interval recover test organisms by washing the squares with adequate agitation in appropriate media or diluting fluid containing appropriate neutralizers. The neutralizers selected must be identified and shown to be effective. Make plate counts on appropriate nutrient agar containing the same neutralizers by the pour or spread plate technique. Exposure time intervals between zero time, 30 min, 1 hr, 3 hr and 6 hr should be tested and reported for each surface treated with the product, as well as for each of the controls.

The results must show a bacterial reduction of at least 99.9 percent over the parallel control count within 3 hr to demonstrate any practical value.

Reference

Horowitz, William, ed. 1970. Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

BACTERIOSTATS—TEXTILE PRESERVATIVES

American Association of Textile Chemists and Colorists. 1968. Antibacterial activity of fabrics, detection of: agar plate method, test method AATCC—90—1965. Pages B–175–B–176 in Technical Manual of the American Association of Textile Chemists and Colorists, vol. 44, Research Triangle Park, N.C.

American Association of Textile Chemists and Colorists. 1968. Antibacterial finishes on fabrics, evaluation of, test method, AATCC 100—1965. Pages B–176–178 in Technical Manual of the American Association of Textile Chemists and Colorists, Research Triangle Park, N.C.

Methods prescribed by the American Association of Textile Colorists and Chemists involving agar plates or liquid culture media may be employed to support residual bacteriostatic claims in the presence of moisture.

RESIDUAL BACTERIOSTATS—LAUNDRY ADDITIVES

Howoritz, William, ed. 1972. Bacteriostatic activity of laundry additives—official first action. Pages 400–403 in 2nd supplement to 11th ed. Official Methods of Analysis of Association of Official Analytical Chemists (Reprinted from *J. AOAC* 55 (2)).

Three samples representing 3 product preparations are tested, with 5, 1-in. sq treated swatches against *Staphylococcus aureus* ATCC 6538 and *Klebsiella pneumoniae*, aberrant, ATCC 4352 on seeded agar for each sample. Duplicate samples of 1 preparation representing 60-day shelflife stability must be tested with 5 replicate fabric swatches on agar seeded with *S. aureus*. Score zone of inhibition along single side of square test fabric samples as 1, so that for 5-replicate plate test, a score of 20 shows that bacteriostasis occurs along all 4 sides of each sample. Effective demonstration of residual bacteriostatic activity requires a zone of inhibition in 18 out of 20 sides.

PHENOL COEFFICIENT

Horowitz, William, ed. 1970. Phenol coefficient—official final action. Pages 59–61 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Any phenol coefficient claim requires testing by the AOAC Phenol Coefficient Method in duplicate on 1 preparation against *Salmonella typhosa*. Where a phenol coefficient is declared against any other bacterium, the test also must be run against each bacterium named.

MYCOBACTERIUM TUBERCULOSIS

Horowitz, William, ed. 1970. Tuberculocidal activity—official final action. Pages 71–72 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Official Analytical Chemists, Washington, D.C.

Claims against *Mycobacterium tuberculosis* must be substantiated with efficacy data derived from the AOAC Tuberculocidal Activity Method on 1 preparation of the product (liquid) under test. If the product is a spray, the procedure must be modified to conform with the AOAC Germicidal Spray Product Method using the media, microorganisms, etc., described in the AOAC Tuberculocidal Activity Method.

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PART IV—PROCUCTION PERFORMANCE

SUBPART B.—AQUATIC PEST CONTROL AGENTS

ANTIMICROBIALS: SWIMMING POOLS AND HUMAN DRINKING WATER SYSTEMS

Horowitz, William, ed. 1970. Water disinfectants for swimming pools—official final action. Pages 68–71 in Official Methods of Analysis of the Association of Official Analytical Chemists, 11th ed. Association of Analytical Chemists, Washington, D.C.

The AOAC Water Disinfectants for Swimming Pools Test is used as the basis for substantiating pool water disinfectant claims and/or claims for the disinfection of drinking water. For each claim, the test is conducted with 3 different batches of the pesticide product against both *Escherichia coli* and *Streptococcus faecalis*. Also, data from duplicate samples of 1 batch of the pesticide product aged to represent 60-day shelf-life stability tested against *E. coli* must be determined.

These data requirements do not apply to simple pesticide formulations of sodium (calcium) hypochlorite, sodium (potassium) dischloro-s-triazinetrione, or trichloro-s-triazinetrione intended for use in swimming pool water, or to sodium (calcium) hypochlorite in well water, when adequate and appropriate directions for water maintenance are provided on the product label. (The other chlorine-releasing chemicals specified cannot be used for drinking water.) These or other pesticidal chemicals, which are proposed for use in treatments of raw waters that can be expected to contain significant quantities of organic substances or which claim effectiveness against bacteria or other organisms other than those named above, will require testing by procedures other than those set forth above or by appropriate modifications of the AOAC test. Specific modifications will relate to and be contingent on label claims and use patterns.

FISH TOXICANTS, REPELLENTS AND REPRODUCTIVE INHIBITORS

A review of the needs to control fish and the possible physical, biological and chemical controls has been published by Lennon (1970). More specific reviews on fish toxicants and the information necessary for registration of a product have also been published (Lennon et al., 1970 and Schnick, 1972). (See also Part VII. Hazard Evaluation, Subpart B. Aquatic Toxicology.)

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Schnick, R. A. 1972. A Review of Literature on TFM (3-triflormethyl-4-nitrophenol) as a Lamprey Larvicide. Bur. Sport Fish. and Wildl. Invest. in Fish Control No. 44. 31 pp.

FISH TOXICANTS

Laboratory Studies. In the early testing of a potential piscicide, the toxicity is determined by toxicity test. Accepted guidelines for aquatic toxicity testing are published jointly by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation (1971). These methods have been carefully thought out, tested and revised frequently over the past 50 yr; deviations from these methods should not be made unless there is considerable reason to do so. Until fairly recently the static toxicity test was the only technique considered, but now flow through toxicity tests are the preferred method. The latter method affords less difficulty in maintaining an adequate supply of dissolved oxygen, permitting only low metabolite accumulation for the test animals, and greater ability to maintain constant toxicant concentrations and constant water temperatures (Sprague, 1969; Sinley, 1973a). Continuous-flow bioassays require more equipment, but trouble-free equipment has been designed (Mount and Brungs, 1967; Sprague, 1969; Sinley, 1973b). A labor-saving jar rinser, jar emptier and automatic liquid measuring vessel have been described for static bioassay (Hesselberg and Burress, 1967).

The referenced methods suggest using the receiving water as the diluent, but in preliminary testing of a piscicide this requirement would not be necessary. However, the researcher should consider the effect of water quality on fish health and on the toxicity of the piscicide being tested so that misleading results will not be obtained (Doudoroff, 1957; Doudoroff and Katz, 1950 and 1953; Hoar and Randall, 1971; Appelgate and King, 1962; Slonim and Slonim, 1973; Murphy, 1970). Factors that should be considered in laboratory testing are listed below.

1. Because temperature will have an important effect, toxicity tests should be conducted at several different temperatures (Macek et al., 1969).
2. All the fish for a given trial should be obtained from the same source because some strains of fish show resistance to various chemicals (Dziak and Plapp, 1973; Ferguson and Bingham, 1966).
3. Although all life stages of the fish should be tested eventually (Olson and Marking, 1973; Garrison, 1968), only fish of nearly equal size should be tested in a given trial (Murphy, 1971).
4. Because mud will alter the toxicity of the compound in field trials (Ferguson et al., 1965), it may be desirable to conduct some tests in containers with varying amounts of mud (Loeb and Stackey, 1966).
5. In addition to testing the toxicity to the target fish, the effect on other vertebrates (Brooks and Price, 1961; MacPhee and Ruelle, 1969b) and on representative invertebrates (Shoettger and Olive, 1961) and plants should also be determined.
6. The rate of deactivation of the piscicide should be determined (Marking and Walker, 1973; Marking and Dawson 1972; Lee et al., 1971; Loeb and Engstrom-Heg, 1971).

Papers dealing with toxicity tests of specific piscicides suggested for review of techniques include Berger et al., 1969; Herr et al., 1967; Haag, 1931; and MacPhee and Ruelle, 1969b.

In acute toxicity test research, the results require special statistical treatment. Probit analysis is commonly used (Finney, 1947; Litchfield and Wilcoxon, 1949), but a discussion of other statistical analyses has been written by Finney (1964). Rachlin and Perlmutter (1968) present an approach for establishing maximum permissible concentrations.

Field Studies. Protocols for field evaluations have been developed by the U.S. Fish and Wildlife Service Fish Control Laboratories (Cumming, 1972). In addition, Lennon and Berger (1970) and Gilderhaus et al. (1969) have summarized field testing conducted to gain registration of a particular piscicide. Equipment for adding chemicals and monitoring the effect has been described by several researchers (Anderson, 1962; Price and Haas, 1963; Ziebell, 1966; Richard, 1962).

A major problem in field applications is the effect different water qualities have on the toxicity. Howell and Marquette (1962) suggest that a test should be conducted on each body of water before adding the toxicant; other researchers have added the toxicant on the basis of laboratory studies and then tried to explain the erratic results (Huish, 1961; Mayhew, 1960; Callahan and Huish, 1968). Other problems in field applications are discussed in publications by Cushing and Olive (1956); Torblaa (1968); Kiser et al. (1963); Hughes and Lee (1973); Koeppe (1961); Bonn and Holbert (1961); and Cohen et al. (1960).

Because such a variety of organisms is involved in field applications, samples may have to be preserved for later analysis at perhaps several laboratories. Cope (1960) suggests methods for collection. Problems of homogenization of samples have been discussed by Benville (1970) and Daniels et al. (1965); problems of extraction of pesticides, by Hesselberg and Johnson (1972), Hughes et al. (1970) and Bevenue and Beckman (1966).

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FISH REPELLANTS

Published literature on fish repellents is difficult to identify, and much of it is of little value because repellency has not been carefully defined, particularly from the standpoint of duration. Summerfelt and Lewis (1967) published a summary on fish repellents. Their paper, along with one by Hansen et al. (1972), describe apparatus for laboratory testing of repellents. Four other papers describe a mixture of laboratory and field testing of repellents to migrating salmon (Brett and MacKinnon, 1954; Alderdice et al., 1954; Idler et al., 1956; Idler et al., 1961), but none of these constitute a protocol for testing repellents. The alternative is to adapt the protocols developed for piscicides.

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FISH REPRODUCTIVE INHIBITORS

No publications pertaining directly to fish reproductive inhibitors have been identified. Basic information on the reproductive physiology of fishes is available in 2 publications (Hoar and Randall, 1969; and Schreck, 1974). Although the research to control sex in fish discussed by Schreck was not very successful, such control would inhibit reproduction.

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HERBICIDES

Few papers have been identified in the literature concerned specifically with test methods for aquatic herbicides, and most that have appeared deal with greenhouse and laboratory tests rather than field test methods. Since field-testing is the only positive method of showing herbicide efficacy under actual conditions, this section will be concerned only with field test methods. The methods were chosen because they have been used over a period of time, have been generally accepted and have appeared frequently in the literature. Dissipation data are among the most important that must be developed in connection with the use of phytotoxic chemicals in water. Only rarely can the flow of water be controlled, and the water's ultimate use may be uncertain. Frequently it is used for irrigation, livestock, industrial and domestic water, or as an input into a fishery or recreational impoundment.

Several factors are involved in the dissipation of any material in water. The most important are dilution, sorption, volatility and precipitation by chemical reaction. In the absence of significant volatility, dilution is frequently the factor of greatest importance with several exceptions; the loss of diquat by adsorption from flowing water is one of the best examples. Because of this characteristic, however, diquat is very rarely used in flowing water. Dissipation through dilution is not the loss or disappearance of the chemical, but only a reduction in the concentration. Losses due to biological degradation or photodegradation should be minimal because the periods involved are relatively short.

Simple and direct methods for determining the dissipation of several phytotoxic chemicals in flowing water are published (Bartley, 1967, 1969; Chancellor et al., 1957; Demint et al., 1970; Demint, 1971; Frank et al., 1967, 1970; Nelson et al., 1969) Except for the work reported by Nelson et al. (1969) and Bartley (1967, 1969), little has been done to determine the roles played by factors other than dilution in the disappearance of phytotoxic chemicals in flowing water.

Among the hazards posed by phytotoxic compounds in water are the possible injury to irrigated crops and other desirable plants and illegal residues in food and feed crops. Recent publications by Bruns et al. (1972, 1973) illustrate techniques employed in evaluating the tolerance of crops to chemicals in irrigation water and determining the resulting residues. In addition to limiting application rates and treatment exposures to those actually needed to control algae and/or other aquatic vegetation, other precautions may be necessary. If irrigating crops with water containing recommended levels of phytotoxic chemical results in injury to crop plants or produces objectionable residues in feed or food crops, then precautions must be established to permit acceptable use. These precautions might include use of the water only on certain crops, or irrigating with the water might be delayed until the concentration of the chemical has dissipated to an acceptable level. Similar restrictions may be necessary where livestock, potable or recreational waters are contaminated beyond acceptable levels.

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HERBICIDE USE IN FLOWING WATER

In the past, insufficient attention has been given to characteristics of the water in testing aquatic herbicides. The vast majority of publications, if water quality is mentioned at all, list only a few of the characteristics, such as temperature and pH. A more thorough characterization of the water should be provided. There is no longer any question concerning the effect of water quality on the performance of copper sulfate as an algaecide. And, although little if anything has been published concerning water quality on the efficacy of other phytotoxic chemicals, such as the cocoamine salts of endothall and the esters of 2,4-D, studies with these herbicides have provided ample evidence that water quality is very important. The effects of sediment and other forms of particulate matter in water have been reported (Coats et al., 1966; Cochrane et al., 1967; Nelson et al., 1969; Tucker et al., 1967).

Certain chemical and physical characteristics of flowing water are determined largely by the constant movement and turbulence. Stratification and its attendant effects are rarely observed and discontinuous concentrations of nutrients, oxygen and growth regulating chemicals are of minor importance. Naturally-occurring changes in water quality and nutrient levels, other than dissolved gases, are usually minimal during the residence time of water in a stream or other water conveyance system. In most water conducting systems, the volume of water dealt with over a period of time is large in comparison to the area of soil-water interface and the mass of vegetation supported in the system (Peltier and Welch, 1969). Changes in water quality that do occur are, more often than not, due to inputs of sewage effluents, runoff of rainfall or drainage of excess irrigation water into the waterway.

Flowing water makes the use of chemicals for weed control difficult and costly. Also, any hazards in using a particular chemical may become more critical if flowing water is involved. The phytotoxicity of a compound in water is governed largely by the concentration of the phytocide and the length of exposure or contact between the weeds and the herbicide-bearing water. In some instances, there appears to be a fairly precise relationship between the 2 variables of time and concentration. With acrolein, approximately equivalent results are obtained by either 0.1 ppm applied for 48 hr or 0.6 ppm applied for 8 hr. Because of the requirement for a minimum exposure period, it is necessary to apply a herbicide to all the water flowing past a given point during the entire treatment or exposure time. Most herbicide concentrations must be quite high and, because of the large volume of water treated, the expense is considerable.

Finally, although some type of control or check is always desirable, very often it is impossible to secure these in tests in flowing water and the best alternative is observations made before and after treatment. If the period of time involved is 10 days or less, before and after observations of the same sites are preferable to controls that involve different streams or channels or even widely separated sites in the same system. In flowing water it is sometimes possible to leave an untreated section of a waterway upstream from the site where the treatment is made. These untreated sections provide the most reliable comparisons for determining the efficacy of treatments for control of both algae and other aquatic vegetation.

Algae: Control Methods and Testing Procedures. Algae that present the most common and severe problems in flowing water systems are the attached filamentous forms, such as *Cladophora*. Their effects on the delivery capacity of water conveyance systems is magnified far beyond the total mass of vegetation present. Attached filamentous algae are prevalent in concrete lined canals and flumes, but they may also become attached to soil in some instances. Rocks, logs and rooted submersed or marginal aquatic weeds also are common sites for attachment. The filamentous green algae, because of their size, are usually the most obvious; in cold water from snow melt or high altitude lakes, however, some species of blue-green algae predominate. An attached layer of scum of variable thickness composed of algae, sediment, fungi and many forms of aquatic microfauna usually indicate the presence of blue-green algae.

In addition to attached algae, planktonic forms are usually present in flowing water, but because of their minute size, plankton algae are not often considered a problem. Rarely, macroscopic free-floating algae, such as *Aphanizomenon*, enter canals or streams where they may create havoc in water diverted to irrigation sprinkling systems. Except in very long water distribution systems, such as the California Aqueduct and the Delta Mendota Canal in California, there is little opportunity to control phytoplankton once they have entered canals or streams. Control, if required, should be done in the lakes, reservoirs or other sources of water that are more sedentary and before the water enters streams or other conveyance systems.

Several techniques are recognized for controlling algae in flowing water. Two techniques rely on the direct addition of algaecides to the water (Schachterle, 1962); the additions are commonly referred to as the "slug" method and the "continuous application" method. The "slug" method employs instantaneous or short-term applications of relatively high concentrations of algaecides to restricted volumes of flowing water; "continuous application" implies low concentrations of the algaecides applied over long periods of time and, consequently, treatment of large volumes of water (Bartley, 1967). A third technique involves the use of antifouling, or other, coatings that prevent the attachment of algae either by their toxic properties or by physical characteristics that make attachment difficult (Bartley and Otto, 1964, 1965, 1967). Coatings attempted in the past ranged from copper sheets to paints containing various ingredients. Sites where antifouling materials are most commonly used are flumes constructed of concrete or other material and concrete lined canals.

Slug Method of Treatment. The slug method of applying algaecides in flowing water has been described numerous times (Chancellor et al., 1957; Nelson et al., 1969; Schachterle, 1962), particularly in connection with slug applications of copper sulfate. The method is simple but does require quite precise measurements of the volume of water flow. The same technique, with little or no modification, is used in slug treatments with herbicides for control of submersed vascular weeds (Agricultural Research Service, 1963; Timmons, 1960).

Successful slug application of algaecides in flowing water is dependent upon: (1) Adequate contact time between the algae and algaecides, and (2) a concentration of the algaecide that will produce a lethal effect on the algae during the contact period provided. From this it is evident that, with some algaecides at least, increasing the contact time will permit the use of lower concentrations; conversely, increasing the concentration will decrease the contact time. Consequently, the contact time is determined by the velocity of water flow and the length of the algaecide-bearing slug of water in the canal or stream. Initially, the length of the slug of treated water designed to provide a 30-min contact period will be twice as long in water flowing at a velocity of 2 ft/sec as in water flowing at 1 ft/sec. The total amount of algaecide applied in the faster flowing water will be twice the amount needed in the water of 1 ft/sec velocity.

The manner of introducing the algaecide into water is not significant, except for crystals or other solids and for volatile chemicals, such as acrolein. Uniform dispersion throughout the body of water does not occur until after the water has travelled some distance (Demint, 1971; Feuerstein and Selleck, 1963). In small (up to 100 cu ft/sec) canals, complete dispersion is usually accomplished during the first 0.25 to 0.5 miles of water flow. This may not hold true for canals carrying several hundred or several thousand cubic feet of water per second.

Quantitative measurements to determine the effectiveness of algaecides on filamentous algae are difficult to obtain. Biomass, percent cover and similar determinations are of value only in theory because variability among checks and controls is normally very great. Consequently, visual observations are usually used to estimate the degree of control. No difficulty is encountered where complete control is accomplished. Where partial control follows the use of an algaecide, however, an estimate of percent control is essential along with some documentation of the change in number of species and their contribution to the mass and total population. Evaluation in terms of "satisfactory" or "acceptable" control are of limited value.

Tests for efficacy should be sufficiently extensive and numerous to establish the most satisfactory concentrations and contact periods, or at least an acceptable range of these. In any one locality or geographic area, 3 tests should be the minimum and 6 or more tests are desirable. The parameters and data determinations that should be recorded and reported are enumerated below.

1. Herbicide application.

a. Length of application (instantaneous slug, for example, dumping from dumptruck; or application extended up to several hours).

b. Formulation or physical state of algaecide (powder, crystalline, liquid, other).

c. Method of application (spray boom, spreader, bag, dumping, other).

d. Application date.

e. Amount applied.

2. Observations on water.

a. Water temperature.

b. Water quality (pH, hardness, alkalinity, conductivity, appropriate anions and cations, turbidity, sediment).

c. Water velocity.

d. Volume of flow.

e. Length of canal or other waterway treated.

f. Type of conveyance (earthen, concrete lined, other).

3. Observations on algae control.

a. Species present before treatment.

b. Amount of algal growth (density, mass, length, other) present before treatment.

c. Species controlled by treatment.

d. Species not controlled.

e. Extent of algae control (miles of waterway).

f. Reduction in total mass of algae.

g. Observation dates.

h. Length of control (period between treatments).

i. Number of treatments needed per season.

4. Control of check treatments.

a. Comparison with untreated section of same waterway.

b. Comparison with conditions before treatment.

c. Comparison of results with those of a similar treatment standard, such as copper sulfate.

Continuous Method of Treatment. The use of this method to control algae in flowing water has so far been limited to the application of copper sulfate (Bartley, 1967). The continuous application method is similar in most respects to the slug treatment; continuous application may be considered as a slug of long or infinite duration. Factors to be considered and data required in respect to the algaecide application are identical. For detailed enumeration of the parameters and data determinations that should be recorded and reported, see discussion on the slug method of treatment.

Observations made on control of algae might differ slightly in that control with the continuous application may not be evident immediately because of the lower dosage one would anticipate employing. If the treatment dosage used is not constant, or if the treatment is of extended duration but discontinuous during the season, then it is necessary to establish the initial and followup treatment rates and the duration of each treatment period in terms of days, weeks or months. The use of checks or controls would also be similar in both slug and continuous application.

The most important differences between the slug and continuous application methods have to do with pollution and residues. Unlike the slug treatment, in which the algaecide concentration at any specific point downstream proceeds from a zero level upward to a maximum and then recedes to zero, the algaecide concentration at a given point downstream from the site of continuous application reaches a maximum level which remains constant until the treatment is discontinued. The effect of dilution on dissipation of the algaecide in the continuous application is transitory and restricted to the beginning and terminal portions of the application.

Because of the possible long-term water contamination, it is necessary (1) that the treatment dosage in continuous applications be sufficiently low to be compatible with the various water uses encountered downstream; (2) that a safe concentration of chemical is achieved through dissipation before use of the water; or (3) that the treatment be interrupted periodically to permit specified use of the water (irrigation of crops for example) from that portion of the channel where dissipation has not progressed to the extent that an acceptable level of algaecide is reached.

Antifouling Coatings. Antifouling coatings have traditionally been used to inhibit the attachment of marine algae and barnacles on ships, pilings and other underwater structures. For many years, the most successful of these have been paints containing some form of copper. More recently, other metals and organic metal compounds, such as tributyl tin oxide, have been incorporated into antifouling paints. Empirical methods for testing other antifouling materials have been tried with varying degrees of success. One has been the use of bituminous, vinyl or other paint bases that, in themselves, are not too effective in preventing the attachment of algae. They do, however, facilitate removal of the attached algae by physical means, such as sweeping or high velocity water jets. The successful use of paint surfaces that continuously slough into the water at slow rate and thereby prevent large-scale attachment of algae has been reported.

Because of the cost, the use of antifouling coatings has been limited to critical surfaces or water delivery systems such as flumes of measuring weirs. But, because of the large increases in the cost of algaecides, such as copper sulfate, and the inability of industry to meet the current needs, strong consideration is being given to greater use of antifouling materials. This is particularly true where the financial return on delivered water, for example, for hydroelectric power generation, has increased sharply.

Efficacy testing of antifouling materials is relatively straightforward, at least in respect to the types and quantities used in the past. Because the materials leach into the water at very slow rates, residues from limited applications should be essentially nil. Large-scale use may change the situation entirely and require an assessment of residues, their levels and dissipation rates and hazards that these might present to crops, humans, livestock and the aquatic environment. Most of the work on developing methods for testing antifouling materials in water distribution systems has been done by the Bureau of Reclamation (Bartley and Otto, 1964, 1965, 1967).

The parameters and data determinations that should be recorded and reported are enumerated below.

1. Herbicide application.

a. Structure and construction material.

b. Surface preparation.

c. Method of application (brush, spray, etc.).

d. Amount applied (thickness, weight, etc.).

e. Curing required.

f. Time of year applied.

g. Formulation used.

h. Amount active ingredient.

i. Size of treated area.

2. Observations on water.

a. Water temperature.

b. Water quality (alkalinity, pH, hardness, appropriate anions and cations, conductivity, turbidity, sediment).

c. Active water delivery period(s).

d. Water volume and velocity.

3. Observations on algae control.

a. Algal species controlled.

b. Algal species not controlled.

c. Date of appearance of algae.

d. Amount of algal growth (density, mass, length, other).

e. Effective life of coating (number of seasons).

f. Period of acceptable control.

g. Observation dates.

4. Control or check treatments.

a. No treatment.

b. Recognized standard antifouling material.

Submersed Vascular Weeds: Control Methods and Test Procedures. Submersed vascular weeds in flowing water, although usually not as numerous in number of species as in static water, create serious problems that often must be attended with minimum delay. Weed infestations that become severe enough to impede the flow of water may cause flooding and, in irrigation systems, lead to inadequate delivery of water to farmers. With multiple-use water, deficiencies may also occur in volumes of water available for generation of electrical power and in supplies of domestic water. Consequently, some method for coping with excessive weed growth in flowing water is essential. No study has been made to determine the social or economic impact of submersed weeds in flowing water; however, some data are available on the extent and cost of weed control in western irrigation systems (Timmons, 1960, 1970).

Almost all of the methods presently used for testing herbicides in flowing water were developed in irrigation canals. This is where water delivery was most critical, where hazards to the aquatic environment were minimal and where the only financial resources were and still are available for such weed control development. Very few attempts are made to control submersed vascular weeds in natural streams; no public or private entity will assume the responsibility for weed control in other than navigable streams.

Up to the present, the "slug" method has been found most practical and best suited for use with the herbicides now available. The earliest chemical treatments for submersed weeds in flowing water were based on this technique (Shaw and Timmons, 1949). The "continuous application" technique is also used to control submersed weeds in irrigation systems. The principal factors limiting greater use are scarcity of herbicide chemicals that perform satisfactorily and cost. A third method that has been tested, but that is used infrequently because of lack of a suitable herbicide, involves treating the soil of weed infested waterways during periods when they do not contain water (Frank, et al., 1963).

Slug Method of Treatment. The discussion of the slug method of treatment to control algae applies to its use to control submersed vascular weeds in flowing water. (For details, see that discussion.)

Continuous Method of Treatment. For detailed discussion, see the section on the continuous application method to control algae in flowing water.

Canal Bottom Treatment. In theory, treatment of the soil during periods when there is no water flow is an ideal procedure for control of submersed weeds in waterways (Frank, et al., 1963). In practice, the method has been erratic, with results ranging from no control to weed eradication lasting several years. The principal hindrance to utilizing this method is the absence of herbicides with characteristics that fix them in the soil and still permit retention in their phytotoxic properties. Most herbicides presently available are inactivated by adsorption in soil, are too rapidly degraded or are subject to varying degrees of leaching depending upon the vagaries of the weather.

Only minimal research has been carried out on the behavior and fate of herbicide residues that occur in flowing water as a consequence of treating the soil in dewatered canals or other temporarily dry waterways (Comes, et al., 1974; Frank, et al., 1967).

If canal bottom treatments are employed, data concerning residues in the water following soil treatment are required. They can be obtained by using a modification of a system of monitoring already published (Frank, et al., 1967 and Frank, et al., 1970). Other parameters and data requirements that should be recorded and reported are listed below.

1. Herbicide application.
   a. Formulation of herbicide.
   b. Method of application.
   c. Treatment rate.
   d. Date applied.
   e. Incorporated in soil.
2. Observations on water, soil and weather.
   a. Type of soil and texture.
   b. Type and amount of precipitation and general climatic conditions between application and time water is turned into canal.
   c. Size of canal.
   d. Water temperature.
   e. Water quality.
   f. Water velocity and volume.
3. Observations and weed control.
   a. Species present before treatment.
   b. Amount of weed growth (mass, density, length, other) before treatment.
   c. Time of appearance of weeds.
   d. Weed species controlled.
   e. Weed species not controlled.
   f. Reduction in amount of weed growth (mass, density, length, other).
   g. Observation dates.
   h. Length of control.
   i. Frequency of treatments needed for weed control.
4. Control or check treatments.
   a. Comparison with untreated sections in same canal.
   b. Comparison with weed conditions during previous year(s).
   c. Comparison of results with results from other types of treatment with other herbicides.

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HERBICIDE USE IN STATIC WATER—GENERAL CONSIDERATIONS

Chemical and Physical Parameters. For all field tests in static waters, certain chemical and physical parameters should be determined and reported in order to describe the test conditions. These parameters should include, but not necessarily be limited, to the following: pH of water, hardness of water, alkalinity of water, dissolved oxygen in water, temperature of water. The determination of these parameters can be made according to the methods outlined by the American Public Health Association (1965) and Golterman (1971), or by other commonly accepted practices, such as electrometric methods. Other observations, such as the presence of a thermocline or extremely muddy water, should also be reported.

Biological Parameters. Certain biological parameters should be recorded at the beginning of every field test. These should include: plant species present, plant density, stage of growth of target species (seedling, pre-flowering, flowering, senescent, etc.). Other appropriate biological observations should be made as necessary. An example of an additional observation would be the presence of a heavy algae bloom in a test where the target species were vascular plants. Another example would be the presence of a heavy coating of epiphytic algae on the leaves of vascular plants.

Types of Plots. Field tests in static waters may be conducted by treating 4 basic types of plots: (1) Whole ponds, (2) open plots, (3) enclosed plots, and (4) plastic pools or other artificial containers.

Whole pond treatments have been used for many years and most closely approximate actual use conditions for an aquatic herbicide. However, the method has several disadvantages. First, it is difficult, if not impossible, to obtain true statistical replicates. Even adjacent ponds, separated by narrow dikes and located on identical soils, frequently react in dissimilar manners when treated with herbicides. In addition to making replication difficult, this lack of uniform behavior also makes it difficult to compare treated ponds with untreated checks or control ponds. Usually comparing the same pond before and after treatment is more meaningful than comparing a treated pond with an untreated pond.

Open plots are defined, treated areas in larger bodies of water; the plot is not enclosed or contained by any artificial means. Open plot treatments have been used successfully under a variety of situations. A comparison of open plot treatments with whole pond and plastic enclosure treatments can be found in 3 papers by Walker (1964, 1964, 1965).

There are major differences between whole pond tests and open plot tests. First, is the problem of dilution of the herbicides by the surrounding untreated waters. This makes the size of the plot very important. Although many investigators have used smaller size plots, there is some opinion that, to get meaningful reliable results, open plots should be at least 0.25 acre. With this size plot, border effects can be ignored and data can be taken from the centers of the treated areas. Second, with open plots one must also be cognizant of water movement from currents, tides or even wind action, which might carry the herbicide out of the plot boundaries. One advantage over whole-pond treatments is that, with many plots in one body of water, plot-to-plot variation is less a problem.

Enclosed plots are plots in larger bodies of water which are "sealed off" from the rest of the water mass, usually by plastic film. Enclosed plots have been used by various investigators in the past (Gallagher et al., 1968; Walker, 1964, 1965). They offer the smallest, most reproducible type of plots available for use with naturally-occurring plants, which have not been disturbed or transplanted, and a natural bottom which has been disturbed very little, if at all. They can be quite small because there is no dilution of the herbicide by the surrounding untreated water. This is a distinct advantage over the open plot method. Also, because of their smaller size (5 ft x 5 ft used successfully by Gallagher et al., 1968), visual estimation of herbicidal effectiveness is simpler and probably more accurate. A major concern with enclosed plots is to assure that the plastic is not permeable to the herbicide and that the herbicide is not adsorbed or absorbed by the particular type of plastic being used. It is also important that a tight seal be obtained at the bottom.

Above-ground, plastic-lined swimming pools offer a convenient system for testing potential aquatic herbicides. The method is described in detail by Lawrence and Blackburn (1962). The same care must be taken as with enclosed plots to assure the herbicide is not adsorbed or absorbed by the plastic liner.

The advantage of plastic pools is that a wide number of variables can be studied under semicontrolled conditions and a wide spectrum of weeds can be tested. To find the desired weed species growing under the desired conditions in natural bodies of water suitable for field tests is often an impossible task. On the other hand, the results of plastic pool tests should not be over-extrapolated to natural bodies of water. The substrate added to the pool is "artificial" and may not resemble natural pond or lake sediments in either chemical composition or physical structure. Some degree of testing by either the whole pond or open plot method should be done to confirm the results of plastic pool tests.

ALGAE CONTROL

Plot Types. Algaecides may be tested by 3 of the 4 treatments listed above—entire pond treatment, enclosed plots or plastic pools. Open plots are generally not acceptable for algae control tests because of the drift of algae into and out of the plots over a period of time. If plastic pools are used, soil should be placed in the pool bottom even though the algae may not require it for growth. It should also be determined in advance that the algaecide being tested is not absorbed or adsorbed by the specific type of plastic used for the pool liner.

Application Methods. Application methods may vary with the formulation of the algaecide being tested. The major requirements are (1) that the method used is described in detail and (2) that the method results in reasonably uniform distribution of the algaecide in the test area. The latter is particularly important when treating mats of filamentous algae.

Evaluation of Plots. The types of observations to be made and recorded will depend on the type of algae present. In the case of filamentous algae occurring on the substrate and/or occurring as floating mats, visual estimates of the decline in algae are the only practical method of determining efficacy. In the case of single-celled planktonic forms or small planktonic colonies of cells, more precise methods are available. Direct counts of cells or colonies may be made according to the methods outlined by the American Public Health Association, Inc. (1965). Another method entails measuring chlorophyll in water samples according to any of the methods detailed by Golterman (1971).

Visual estimation of water color and/or turbidity is not normally sufficient for measuring the degree of control of this type of algae when tests are performed in the field.

SUBMERSED VASCULAR PLANT CONTROL

Plot Types. Any of the 4 basic types of plots can be used for attached submersed vascular plants. The choice of plot-type would depend on the objectives of the particular test.

Application Methods. Application methods will vary widely with the formulation of herbicide being tested, the size of the plots and, possibly, the rate of application. It is important that: (1) The method be described in detail; (2) reasonably uniform coverage of the plots be attained; and (3) accurate amounts of herbicide be applied.

Evaluation of Plots. Evaluating the effects of the herbicide on the weed population is somewhat difficult. Although some researchers have attempted to run transects through ponds or to remove and weigh all vegetation from randomly selected areas, etc., the vast majority of tests are evaluated by visually estimating the reduction in vigor and stand density of each weed species present. This is the only really practical means of determining efficacy and is very accurate if done carefully. In deep water, where visibility of the bottom is difficult from a boat or from the shore, SCUBA gear can be utilized to great advantage.

FLOATING VASCULAR PLANT CONTROL

Floating vascular plants fall into 2 categories: attached and free-floating.

Floating — Attached. Floating-attached weeds, such as waterlily and watershield, can be treated very much like submersed species (American Public Health Association, Inc., 1965; Comes and Morrow, 1971; Gallagher et al., 1968). If a liquid spray is being used, complete and uniform coverage of the plot is more important with the floating types because the leaves are receiving the spray directly.

Comes and Morrow (1971) used open plots of 50 ft x 50 ft and 25 ft x 25 ft on waterlily. Longer control was obtained in the 50 ft x 50 ft plots, indicating that plot size can be an important factor if evaluation of results is to extend over a period of time.

Free-floating. Free-floating species, such as duckweed and water-hyacinth, may be tested by the whole-pond, enclosed-plot, or plastic-pool methods discussed. The open plot method is not suitable for free-floating species because the plants will move in and out of the plots from wind action and may even become intermingled with untreated plants.

The method of application is more important with floating plants than with submersed plants. If a spray is used which strikes the exposed leaf surfaces, then uniformity of coverage is just as important as it is when testing herbicides on terrestrial plants. Whatever method of application is used, a detailed description of the method should be included with the results.

Effectiveness of the herbicide can be evaluated by visual estimation of stand density and plant vigor.

EMERSED AND MARGINAL PLANT CONTROL

Emersed and marginal species should be treated in much the same manner as terrestrial weeds. The open-plot method normally would be the only method used, although the other 3 methods might be used under special circumstances. An example of the use of open plots in shallow water is the work of McGilvery and Steenis (1965) on alligatorweed.

As with floating species, the method of herbicide application should be one which insures uniform coverage of the plots, particularly in the case of postemergence treatments.

Plot size has to be fairly large, especially for rhizomatous or stoloniferous species. Plants such as *Phragmites* will rapidly invade a plot from the surrounding untreated areas and impede evaluation of the plot as time progresses. For plants like *Phragmites* the absolute minimum plot size should be one one-hundredth of an acre (21 ft x 21 ft) but larger plots are preferable if they are going to be evaluated for more than 1 yr. Buffer strips or alleys between plots should be at least 6 ft wide to minimize the problem of rhizomes from treated plants in one plot crossing the buffer and sending up shoots in the next plot.

Marginal and emersed plants can sometimes be individually counted, measured, or harvested and weighed to assess the effect of the herbicide, but this is rarely necessary or even justifiable. A careful visual estimation of stand density and plant vigor in relation to control plots is adequate for determining herbicide efficacy.

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SUBPART C

Product performance: Fungicides and nematicides IV.C-1
Recommended practice for field evaluation of fungicides used for controlling celery late blight disease IV.C-1
Recommended practice for field evaluation of fungicides used for controlling rose black spot disease IV.C-6
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PART IV—PRODUCT PERFORMANCE

SUBPART C—FUNGICIDES AND NEMATICIDES

RECOMMENDED PRACTICE FOR FIELD EVALUATION OF FUNGICIDES USED FOR CONTROLLING CELERY LATE BLIGHT DISEASE

(This procedure, TSD Designation 6.301, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 This method is intended for evaluating the efficacy of fungicides in controlling celery late blight disease under field conditions.

2. Test Site.

2.1 Soil should be suitable for celery growth and climatic conditions favorable for disease development. Overhead irrigation should be available to establish high humidity, where necessary, and disseminate spores.

3. Climatic Conditions.

3.1 Late blight develops best under cool weather conditions. Temperatures favorable for spore germination and infection are 16 to 21° C. Spattering and wind-blown water are the major means of spore dissemination (1, 2).

4. Test Plants.

4.1 Giant Pascal Celery[1] is highly susceptible to *Septoria apiicola Spec.* Other susceptible varieties are acceptable.

4.2 Plant seed in 51 by 51 mm plant bands or peat pots in the greenhouse three months before transplanting in the field.

4.3 Transplant seedlings in the field 152 to 203 mm apart within the row.

4.4 Plant rows on 762 mm centers.

NOTE: Superscript arabic numbers refer to information footnotes at the end of the paper. Parenthetical numbers indicate literature citations at the end of the paper.

5. Organism.

5.1 *Septoria apiicola Speg.* is the casual organism of celery late blight disease. *Septoria apiicola Speg.*, published in 1887, has priority over the names *Septoria apii* (Briosi & Cav.) Chester and *Septoria appi-graveolentis* Dorogin and is the correct name (3).

6. Test Plot Management.

6.1 Two growing seasons may be necessary to establish an epiphytotic of celery late blight. No testing can usually be done until the second year. In certain areas where the disease is endemic no establishment may be necessary. In such a case, steps 6.3 and 6.4 may be eliminated.

6.2 Plant celery as in 4.3 and 4.4.

6.3 Obtain infected celery foliage from a diseased field and scatter evenly throughout the plot area.

6.4 Sprinkler irrigate three times a week unless rain occurs with similar frequency. This is most important in spreading the spores of the fungus and producing heavy infection on the young celery plants. The first year infection will generally not be heavy enough or evenly dispersed throughout the plot to permit fungicide testing. However, this may not be true in some areas where natural conditions may hasten spread of infection.

6.5 Celery in plots established in mild climates (e.g., Pacific Northwest, California, Gulf States, Georgia, Florida) will overwinter as viable mature plants. Infections will also overwinter. The second year remove the old plants from every second and third row, leaving the first row of every three rows to serve as a source of inoculum. Replant the second and third rows with seedlings as in 4.3 and 4.4. These replanted seedlings will be used for fungicide testing the second year.

6.6 In areas of the country where winter conditions preclude overwinter celery plant survival, the fungus should be collected on the infected plant material and air dried. This material should be stored in a cool, dry place for future use.

7. Procedure.

7.1 Use a randomized block design.

7.2 Use at least four replications per treatment.

7.2.1 For each replication use 4.6 to 6.1 m of row.

7.2.2 Separate each treatment within rows by 305 to 610 mm buffer zone planted to celery.

7.3 Arrange treatments according to Snedecor's Randomly Assorted Digits Table (4), or a similar random digit table.

7.4 Begin treatments soon after the celery plants are transplanted in the field or according to label directions.

7.5 Apply treatments using one or more of the following:

7.5.1 A row crop sprayer adjusted to deliver the desired rate in gallons per acre or liters per hectare.

7.5.2 A hand sprayer, applying the desired rate in gallons per acre or liters per hectare.

7.5.3 A hand duster[2] applying measured amounts per ft, acre, or hectare.

7.6 Controls.

7.6.1 Use Bordeaux Mixture 4–4–100 (4.5 kg—4.5 kg—379 litre) as the Standard fungicide treatment.

7.6.2 Untreated controls shall be used to determine the disease severity and to provide a basis of comparison of the treatments.

8. Data Determinations.

8.1 Visual estimates of disease incidence or actual counts of random infected leaves should be recorded for each plot. A mean disease incidence for each treatment should be determined and the percent disease control calculated according to the formula below (5, 6):

$$\text{Percent Disease Control (PDC)} = \frac{\text{Disease Incidence in Control (DIC)} - \text{Disease Incidence in Treatment (DIT)}}{\text{Disease Incidence in Control (DIC)}} \times 100$$

8.2 Analyze the variance for all treatments using conventional analysis of variance methods (5) and express significance of results at the 95 percent confidence level.

9. Phytotoxicity.

9.1 The type of phytotoxicity should be reported together with the percent of phytotoxicity. Common types of phytotoxicity are: Leaf burning, chlorosis, and stunting.

10. Reporting.

10.1 The following information should be included in reporting test results:

10.1.1 Product name and EPA Registration Number.

10.1.2 Active ingredient(s) and percentage of each.

10.1.3 Rate of application.

10.1.4 How the product was applied.

10.1.5 Number of plants per treatment, or m (ft) of row.

10.1.6 Number of replications.

10.1.7 Spraying or dusting dates.

10.1.8 Mean percent disease incidence.

10.1.9 Mean percent disease control.

10.1.10 Percent phytotoxicity.

10.1.11 Types of phytotoxicity.

10.1.12 Residue present in marketable portions of plant.

10.1.13 Variety used.

11. Effectiveness.

11.1 Effective products should provide a mean disease control of 70 percent or more.

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(1) Cochran, L. C., "A Study of Two Septoria Leaf Spots of Celery," *Phytopathology*, PHYTA, Vol. 22, 1932, pp. 791–812.
(2) Owens, C. E., *Principles of Plant Pathology*, John Wiley and Sons, Inc., New York, N.Y., 1925, pp. 469–474.
(3) Gabrielson, R. L. and Grogan, R. G., "The Celery Late Blight Organism *Septoria apiicola*," *Phytopathology*, PHYTA, Vol 54, 1964, pp. 1251–1257.
(4) Snedecor, George W. and Chochran, William G., *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, Iowa, 1967.
(5) Horsfall, J. G. and Barratt, J. W., "An Improved Grading System for Measuring Plant Diseases," *Phytopathology*, PHYTA, Vol 35, 1945, p. 655.
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RECOMMENDED PRACTICE FOR FIELD EVALUATION OF FUNGICIDES USED FOR CONTROLLING ROSE BLACK SPOT DISEASE

(This procedure, TSD Designation 6.305.1, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

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[1] Giant Pascal Celery seed may be purchased from W. Atlee Burpee Co., 18th Street and Hunting Avenue, Philadelphia, Pa. 19132.

[2] Scott Model A61 hand duster has been found satisfactory for this purpose.

1. Scope.

1.1 This method is intended for field evaluation of the efficacy of fungicides used for the control of rose black spot disease.

2. Test Site.

2.1 Soil suitable for rose growth and climatic conditions favorable for disease development. Overhead irrigation should be available to establish high humidity, where necessary. Black spot disease should be endemic in the test area.

3. Climatic Conditions.

3.1 Spore germination and infection are favored by temperatures of 16 to 21° C. Infection requires a wet leaf surface for a period of 6 to 7 h (1, 2, 3).

4. Test Plants.

4.1 Should be of a variety such as Juliet, susceptible only to black spot disease and highly resistant to other foliar diseases. Other varieties are acceptable.

5. Organism.

5.1 Rose black spot disease is caused by *Diplocarpon rosae* Wolf. Pathogenic races of *Diplocarpon rosae* have been reported as differing in their ability to cause disease in host varieties (4).

6. Procedure.

6.1 Use a randomized block design.

6.2 Use at least four replications per treatment. More replications are needed in areas where the disease incidence is light.

6.3 Each replication should consist of one or more bushes of the suspect.

6.4 Treatments should be arranged according to Snedecor's Randomly Assorted Digits Table (5), or equivalent.

6.5 Treatments should begin before the disease appears, or according to label directions.

6.6 Treatments should be made using one or more of the following depending upon use directions:

6.6.1 A power sprayer adjusted to deliver the desired rate.

6.6.2 A hand sprayer.

6.6.3 A hand duster.

6.6.4 A hose sprayer.

6.6.5 An aerosol or low pressure sprayer.

6.7 Plots should be sprinkler irrigated for 3 to 4 h in the late afternoon, 24 h after treatment. This simulates natural rainfall. If at least 2.5 mm of rain falls, do not irrigate.

7. Controls.

7.1 For standard control spray, use Benlate 50 W 227 g/379 liters (8 oz/100 gal) or Maneb 80W g/379 liters (1½ lb/100 gal), or other known effective chemical, whose identity and rate must be indicated in report.

7.2 Untreated control bushes are used to determine the disease severity and to provide a basis for comparison of the treatments.

8. Data Determination.

8.1 Record disease incidence for each treatment replicate. Use either the visual estimate method of Horsfall and Barrett (6, 7) or determine the percent control on the basis of difference between averages of number of lesions on treated and untreated randomly selected leaves.

8.2 The percent disease control may be calculated as follows:

$$\text{Percent Disease Control (PDC)} = \frac{\text{Disease Incidence in Control (DIC)} - \text{Disease Incidence in Treatment (DIT)}}{\text{Disease Incidence in Control (DIC)}} \times 100$$

9. Effectiveness.

9.1 Effective products should provide a mean disease control of 70 percent or more.

10. Phytotoxicity.

10.1 The type and percentage of phytotoxicity, if any, shall be reported. Common types of phytotoxicity are: Leaf burning, chlorosis, and stunting.

11. Reporting.

11.1 The following information should be included in reporting testing results:

11.1.1 Product name and EPA Registration Number.

11.1.2 Active ingredient(s) and percentage of each.

11.1.3 Application rate.

11.1.4 How the product was applied.

11.1.5 Number of plants per treatment.

11.1.6 Number of replications.

11.1.7 Spraying or dusting dates.

11.1.8 Mean percent disease control.

11.1.9 Mean percent disease incidence.

11.1.10 Percent phytotoxicity.

11.1.11 Types of phytotoxicity.

11.1.12 Light, medium, or heavy residue on foliage.

11.1.13 Color of residue.

11.1.14 Analysis of variance of the data. Express significance of results at the 95 percent confidence level.

Literature Cited

(1) Chester, K. Starr, *Nature and Prevention of Plant Diseases*, The Blakiston Company, Philadelphia, Pa., 1950, p. 138.

(2) Massey, L. M., "Blackspot Can Be Controlled," *American Rose Annual*, AMRAA, Vol 31, 1946, pp. 111–118.

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(5) Snedecor, George W., and Cochran, William G., *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, Iowa, 1967.

(6) Horsfall, J. G., and Barratt, J. W., "An Improved Grading System for Measuring Plant Diseases," *Phytopathology*, PHYTA, Vol 35, 1945, p. 655.

(7) Redman, C. E., King, E. P., and Brown, I. E., Jr., *Tables for Converting Barratt and Horsfall Rating Scores to Estimated Mean Percentages*, Eli Lilly and Company, Indianapolis, Indiana, 1962.

RECOMMENDED PRACTICE FOR FIELD EVALUATION OF FUNGICIDES USED FOR CONTROLLING ROSE RUST DISEASE

(This procedure, TSD Designation 6.305.2, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 This procedure is intended for field evaluation of the efficacy of fungicides used for the control of rose rust disease.

2. Tests Site.

2.1 Soil suitable for rose growth and climatic conditions favorable for disease development. Overhead irrigation should be available to establish high humidity, where necessary. Rose rust should be endemic in the test area.

3. Climatic Conditions.

3.1 Spore germination and infection are favored by temperatures of 18 to 24°C. Infection requires a wet-leaf surface for a period of 4 h (1).

4. Test Plants.

4.1 Should be a variety susceptible only to rose rust disease and highly resistant to other foliar diseases. McGredy's Scarlet variety is highly susceptible to rose rust disease.

5. Organism.

5.1 Rose rust disease is caused by *Phragmidium mucronatum* (pers.) Schlecht.

6. Procedure.

6.1 Use a randomized block design.

6.2 Use at least four replications per treatment. More replications are needed in areas where the disease incidence is light.

6.3 Each replication should consist of one to six bushes of McGredy's Scarlet variety.

6.4 Treatments should be arranged according to Snedecor's Randomly Assorted Digits Table (2), or equivalent.

6.5 Treatments should begin before the disease appears, or according to label directions.

6.6 Treatments should be made using one or more of the following, depending upon use directions:

6.6.1 A power sprayer adjusted to deliver the desired rate.

6.6.2 A hand sprayer.

6.6.3 A hand duster.[1]

6.6.4 A hose sprayer.

6.6.5 An aerosol or low pressure sprayer.

6.7 Plots should be sprinkler irrigated for 3 to 4 h in the late afternoon, 24 h after treatment. This simulates natural rainfall. If at least 2.5 mm of rain falls, do not irrigate.

7. Controls.

7.1 For standard fungicide spray, use Maneb 80W 680 g/379 liter (1½ lb/100 gal), or other known effective chemical, whose identity and rate must be indicated in report.

7.2 Untreated control bushes are used to determine the disease severity and to provide a basis for comparison of the treatments.

8. Data Determination.

8.1 Record disease incidence for each treatment replicate. Use either the visual estimate method of Horsfall and Barrett (3, 4) or determine the percent control on the basis of difference between averages of number of lesions on treated and untreated randomly selected leaves.

8.2 The percent disease control may be calculated as follows:

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[1] Scott's Model A61 hand duster, among others, has been found satisfactory for this purpose.

$$\text{Percent Disease Control (PDC)} = \frac{\text{Disease Incidence in Control (DIC)} - \text{Disease Incidence in Treatment (DIT)}}{\text{Disease Incidence in Control (DIC)}} \times 100$$

9. Effectiveness.

9.1 Effective products should provide a mean disease control of 65 percent or more.

10. Phytotoxicity.

10.1 The type and percentage of phytotoxicity, if any, shall be reported. Common types of phytotoxicity are: Leaf burning, chlorosis, and stunting.

11. Reporting.

11.1 The following information should be included in reporting testing results:

11.1.1 Product name and EPA Registration Number.

11.1.2 Active ingredient(s) and percentage of each.

11.1.3 Application rate.

11.1.4 How the product was applied.

11.1.5 Number of plants per treatment.

11.1.6 Number of replications.

11.1.7 Spraying or dusting dates.

11.1.8 Mean percent disease control.

11.1.9 Mean percent disease incidence.

11.1.10 Percent phytotoxicity.

11.1.11 Types of phytotoxicity.

11.1.12 Light, medium, or heavy residue on foliage.

11.1.13 Color of residue.

11.1.14 Analysis of variance of the data. Express significance of results at the 95 percent confidence level.

Literature Cited

(1) Cochrane, V. W., "The Common Leaf Rust of Cultivated Rose," *American Rose Annual*, AMRAA, Vol 31, 1946, pp. 131–135.

(2) Snedecor George W., and Cochran, William G., *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, Iowa, 1967.

(3) Horsfall, J. G., and Barratt, R. W., "An Improved Grading System for Measuring Plant Diseases," *Phytopathology*, PHYTA, Vol 35, 1945, p. 655.

(4) Redman, C. E., King, E. P., and Brown, I. F., Jr., *Tables for Converting Barratt and Horsfall Rating Scores to Estimated Mean Percentages*, Eli Lilly and Company, Indianapolis, Indiana, 1962.

RECOMMENDED PRACTICE FOR FIELD EVALUATION OF FUNGICIDES USED FOR CONTROLLING ROSE POWDERY MILDEW DISEASE

(This procedure, TSD Designation 6.305.3, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 This procedure is intended for field evaluation of the efficacy of fungicides used for the control of rose powdery mildew disease.

2. Test Site.

2.1 Soil suitable for rose growth and climatic conditions favorable for disease development. Overhead irrigation should be available to establish high humidity, where necessary. Rose powdery mildew should be endemic in the test area.

3. Climatic Conditions.

3.1 Spore germination and infection are favored by temperatures of 18 to 24° C and relative humidity of 95 to 99 percent (1, 2, 3).

4. Test Plants.

4.1 The test plants should be of a variety susceptible only to powdery mildew disease and highly resistant to other foliar diseases. Dwarf Crimson Rambler, White Knight, and Command Performance varieties are highly susceptible to powdery mildew. Other highly susceptible varieties are acceptable.

5. Organism.

5.1 Powdery mildew disease is caused by *Sphaerotheca pannosa* (Wallr.) Lev. var. *rosae* Wor.

6. Procedure.

6.1 Use a randomized block design.

6.2 Use at least four replications per treatment. More replications are needed when the disease incidence is light.

6.3 Each replication should consist of one bush of Dwarf Crimson Rambler, and one bush of each other suscept used. The bushes may be planted 0.76 m apart, with 1.8 m buffer zone between replications.

6.4 Treatments should be arranged according to Snedecor's Randomly Assorted Digits Table (4), or equivalent.

6.5 Treatments should begin before the disease appears, or according to label directions.

6.6 Treatments should be made using one or more of the following, depending upon use directions:

6.6.1 A power sprayer adjusted to deliver the desired rate.

6.6.2 A hand sprayer.

6.6.3 A hand duster.[1]

6.6.4 A hose sprayer.

6.6.5 Aerosol or low pressure sprayers.

6.7 Plots should be sprinkler irrigated for 3 to 4 h in the late afternoon, 24 h after treatment, to produce a period of high humidity. If at least 2.5 mm of rain falls, do not irrigate.

7. Controls.

7.1 For standard fungicide spray, use Parnon 15 cc in 3.8 liter of water. Other effective chemicals may be substituted, whose identity and rate must be indicated in report.

7.2 Untreated control bushes are used to determine the disease severity and to provide a basis for comparison of the treatments.

8. Data Determination.

8.1 Record disease incidents for each treatment replicate. Use either the visual estimate method of Horsfall and Barratt (5, 6) or determine the percent control on the basis of difference between averages of number of lesions on treated and untreated randomly selected leaves.

8.2 The percent disease control may be calculated as follows:

$$\text{Percent Disease Control (PDC)} = \frac{\text{Disease Incidence in Control (DIC)} - \text{Disease Incidence in Treatment (DIT)}}{\text{Disease Incidence in Control (DIC)}} \times 100$$

9. Effectiveness.

9.1 Effective products should provide a mean disease control of 70 percent or more.

10. Phytotoxicity.

10.1 The type and percentage of phytotoxicity, if any, shall be reported. Common types of phytotoxicity are: Leaf burning, chlorosis, and stunting.

11. Reporting.

11.1 The following information should be included in reporting testing results:

11.1.1 Product name and EPA Registration Number.

11.1.2 Active ingredient(s) and percentage of each.

11.1.3 Application rate.

11.1.4 How the product was applied.

11.1.5 Number of plants per treatment.

11.1.6 Number of replications.

11.1.7 Spraying or dusting dates.

11.1.8 Mean percent disease incidence.

11.1.9 Mean percent disease control.

11.1.10 Percent phytotoxicity.

11.1.11 Types of phytotoxicity.

11.1.12 Light, medium, or heavy residue on foliage.

11.1.13 Color of residue.

11.1.14 Analysis of variance of the data. Express significance of results at the 95 percent confidence level.

Literature Cited

(1) Coyler, D. L., "Biology and Control of Rose Powdery Mildew," Thesis, University of Wisconsin, 1961, p. 109.

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(3) Massey, L. M., "Understanding Powdery Mildew," *American Rose Annual*, AMRAA, Vol 33, 1948, pp. 137–145.

(4) Snedecor, George W., and Cochran, William G., *Statistical Methods*, 6th Edition, Iowa State University Press, Ames, Iowa, 1967.

(5) Horsfall, J. G., and Barratt, J. W., "An Improved Grading System for Measuring Plant Diseases," *Phytopathology*, PHYTA, Vol 35, 1945, p. 655.

(6) Redman, S. E., King, E. P., and Brown, I. F., Jr. *Tables for Converting Barratt and Horsfall Rating Scores to Estimated Mean Percentages*, Eli Lilly and Company, Indianapolis, Indiana, 1962.

GREENHOUSE TEST METHOD FOR ROSE POWDERY MILDEW FUNGICIDES

(This method, TSD Designation 6.303, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 This method is intended for use in the greenhouse evaluation of foliar-applied fungicides for the control of rose powdery mildew *Sphaerotheca pannosa* (Wallr.) Lev. var. *rosae* Wor.

2. Test Fungus and Rose Plants.

2.1 The causal organism (*S. pannosa*) is an obligate parasite. Cultures can be maintained on susceptible varieties growing in the greenhouse.

2.2 The rose variety used in this method is Dwarf Crimson Rambler which is highly susceptible to infection by *S. pannosa*. It is an easily grown and handled host for culturing *S. pannosa* inoculum in the greenhouse. Other highly susceptible rose varieties may be substituted for Dwarf Crimson Rambler. If a substitution is made the name of the variety used must be stated when test is reported.

2.3 Grow disease free host plants from rooted cuttings in a medium consisting of 1 part sand, 1 part loam, and 2 parts peat moss in 152 mm clay pots. Incorporate ground limestone into soil mix so as to adjust pH to a range of 5.5 to 7.0. Maintain all plants in the greenhouse at 18 to 24°C day- and 13 to 18°C night-temperatures. Maintain plants in a vigorous growing state by adding plant nutrients as needed.

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[1] Scott's Model A61 hand duster, among others, has been found satisfactory for this purpose.

[1] Scott's Model A61 hand duster, among others, has been found satisfactory for this purpose.

2.3.1 Regularly water plants by adding water to the medium. Do not splash or wet foliage of plants.

2.3.2 Select disease-free test plants of uniform size and vigor.

3. Treatment, Standard and Control (Check) Replications.

3.1 Replicate each treatment four times and include four replicates of standard fungicide and untreated control plants in each test.

3.2 Arrange plants on greenhouse bench in a randomized block design.

NOTE: Parenthetical arabic numbers indicate literature citations at the end of the paper.

4. Fungicide Application.

4.1 Apply fungicide applications, whether sprays or dusts, according to label directions at weekly intervals for a total of four applications. Test plants are removed from greenhouse and sprayed with a DeVilbiss paint spray gun with a No. 30 head at 172 kPa (25 psi) while the plants rotate on a compound turntable (1). If the plants are dusted a vacuum duster is used (2). Sufficient dust is placed in the duster cup for a good coverage of the plant when using 152 mm Hg of vacuum. Use pressurized spray cans as directed and spray plants while on a compound turntable. After spraying the plants are returned to the greenhouse.

5. Standard Fungicide.

5.1 Use appropriate fungicide as a standard depending on whether a product is to be used as an eradicant or a protectant.

5.1.1 If an eradicant is being tested use Parnon, 1.3 percent, 30 cc in 3.8 liter of water.

5.1.2 If a protectant is being tested use Parnon, 1.3 percent, 15 cc in 3.8 liter of water.

6. Untreated Control.

6.1 Untreated controls (unsprayed or undusted plants) shall be used to determine the disease incidence present.

7. Inoculation.

7.1 Heavily mildewed plants, controls obtained from previous tests, are randomly arranged (3.2) throughout the test plants on the greenhouse bench. The conidia are dispersed daily with 414 to 552 kPa (60 to 80 psi) air jet. Heavy air currents from fans will also discharge conidia and can be used instead of the pressurized air. Disperse spores when spore chains are eight spores or more in length.

8. Rating System.

8.1 Each plant is carefully inspected and rated for powdery mildew incidence one week following the fourth spray application. The percent disease control is determined using the following formula (3, 4):

$$\text{Percent Disease Control (PDC)} = \frac{\begin{array}{c}\text{Disease Incidence}\\ \text{in Control (DIC)}\end{array} - \begin{array}{c}\text{Disease Incidence}\\ \text{in Treatment (DIT)}\end{array}}{\text{Disease Incidence in Control (DIC)}} \times 100$$

8.2 Four single plant replications are rated for each treatment. Average the four readings for each treatment (DIT), the four readings for the control (DIC), and apply these data in the formula given above for PDC.

9. Effectiveness.

9.1 Effective products should provide a mean disease control of 70 percent or more.

10. Phytotoxicity.

10.1 The type and percentage of phytotoxicity, if any, should be recorded when it appears or at the same time mildew ratings are taken.

Literature Cited

(1) McCallan, S.E.A. and Wellman, R.H., "A Greenhouse Method of Evaluating Fungicides by Means of Tomato Foliage Diseases," *Cont. Boyce Thompson Inst.*, CBTIA, Vol. 13, No. 3, 1943, pp. 93–134.

(2) Farrar, M.D., O'Kane, W.C., and Smith, Howard W., "Vacuum Dusting of Insects and Plants," *Journal Econ. Ent.*, JEENA, Vol. 41, 1948, pp. 647–648.

(3) Horsfall, J.G. and Barratt, R.W., "An Improved Grading System for Measuring Plant Diseases," *Phytopathology*, PHYTA, Vol. 35, 1945, p. 655.

(4) Redman, C.E., King, E.P. and Brown, I.F., Jr., *Tables for Converting Barratt and Horsfall Rating Scores to Estimated Mean Percentages*, Eli Lilly and Company, Indianapolis, Indiana, 1962.

TEST METHOD FOR EVALUATING MILDEWSTATS ON LEATHER

(This method, TSD Designation 6.202, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 Low pressure spray bombs and liquid products intended for use to control, prevent or inhibit the growth of fungi which cause mildew on various articles or surfaces must be tested to demonstrate *fungistatic* effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Environmental Pesticide Control Act of 1972. It is designed to determine effectiveness of products (applied according to instructions on the labeling) to control mildew and non-pathogenic fungal growth on articles or surfaces of leather, such as book covers, luggage, shoes, and sporting goods. It also indicates duration of protection afforded, providing a basis for recommending repeat applications. Its use will expedite registration and minimize enforcement action.

2. Summary of Method.

2.1 The test is conducted by treating both sides of 1-in. square sections of vegetable tanned cowhide as specified in label directions for use, allowing the leather sections to dry, then on both sides lightly spraying with an inoculum mixture of *Aspergillus niger* and *Penicillium variable*. The squares are incubated individually for one to four weeks in 453.59 g (16-oz) French square jars containing 25.4 mm (1 in.) of water. Mildew growth on treated and untreated leather surfaces is visually rated weekly.

3. Apparatus.

3.1 Glassware: Two 1000-ml Erlenmeyer flasks or other flasks with cotton plugs suitable for preparing agar and for preparing the diluent. Four 250-ml Erlenmayer flasks with cotton plugs, heat sterilized, for use in preparing suspensions of conidia (two for each fungus). Thirty 453.59 g (16 oz) French square jars (10 for treated replications, 10 for untreated, and 10 for the standard fungicide). Prepare the caps by center drilling and inserting 3.175 mm (⅛ in.) brass bolts approximately 12.7 mm (½ in.) in length for attaching a 63.5 mm (2½ in.) piece of #22 nickel chromium wire, bent to form a hook, to suspend the test samples 38.1 mm (1½ in.) below the jar lid.

3.2 Tissue grinder (Homogenizer): No. 4288B, Arthur H. Thomas.

3.3. Atomizer: DeVilbiss #152 (or equivalent) operated at 68.95 kPa (10 psi).

4. Reagents and Materials.

4.1 Test Organisms.

NOTE: Superscript arabic numbers refer to information footnotes at the end of the paper.

4.1.1 *A. niger* (ATCC 6275).[1] Maintain stock cultures on neopeptone agar (10 g neopeptone, 20 g dextrose, 20 g agar, and 1000 ml water). Incubate new stock cultures 7 to 10 days at 25°C (77°F), then store at 2 to 10°C (35.6 to 50°F).

4.1.2 *P. variable*.[2] Maintained and stored same as *A. niger*.

4.2 Leather: Thirty 25.4-mm (1-in.) squares of vegetable tanned cowhide, 1.0 to 1.5-mm thick. Punch or drill a hole in one corner of each square, 6.35 mm (¼ in.) from corner, to facilitate its suspension on a wire hook.

4.3 Standard Fungicide: 0.5 percent solution of p-nitrophenol in 95 percent ethyl alcohol.

5. Procedure.

5.1 Preparation of Conidial Suspension: Place approximately 12.7 mm (½ in.) neopeptone agar into 250-ml Erlenmeyer flask, plug with cotton, autoclave at 103.42 kPa (15 psi) for 20 min. Seed desired organism (*A. niger* or *P. variable*) at center of each flask and incubate for 7 to 10 days at 25°C (77°F). Prepare diluent containing 0.85 percent sodium chloride and 0.2 percent iso-octylphenoxypolyethoxy-ethanol[3] in distilled water, autoclave at 103.42 kPa (15 psi) for 20 min. Pour approximately 100 ml of cooled sterile diluent over culture surface and shake vigorously to dislodge the spores. Pour this spore suspension into heat-sterilized tissue grinder and reciprocate the piston several times to break up spore chains. Filter suspension through a thin layer of sterile absorbent cotton to remove spore chains and hyphal elements. Conidial suspensions may be stored at 2 to 10°C (35.6 to 50°F) for not longer than four weeks. Standardize test conidial suspensions to contain five million conidia per ml (determine by spore count with hemocytometer counting chamber[4]) by adding sterile diluent.

5.2 Treatment: Place ten leather squares in use-dilution of product for three min. For pressurized products, leather squares are placed on a perforated rubber mat and both sides sprayed with product for specified time at recommended distance. When label directions do not specify duration of spray, squares should be sprayed until wet, being careful to obtain equal wetting on both sides of test specimen. Dip the ten leather squares to be treated with the standard fungicide for three min in p-nitrophenol solution, or spray if using pressurized product (4.3). Ten control leather squares are not treated. Dip them in 95 percent ethanol for three min. All squares remained free from mildew growth. to the next step.

5.3 Place equal volumes of well agitated *A. niger* and *P. variabile* spore suspensions (5.1) in a #152 DeVilbiss atomizer (or equivalent), maintain agitation and lightly spray both sides of each leather square with the mixture.

5.4 Incubation: Suspend leather squares in individual 453.59 g (16 oz) French square jars containing approximately 25.4 mm (1 in.) distilled water and incubate at approximately 28°C (82.4°F). Tighten the caps, then back off ⅛ turn to allow for some ventilation.

6. Determination of Results.

6.1 Evaluation: Observations are recorded weekly for four weeks or until abundant growth occurs on the treated squares. Visual observation of presence or absence of mold on leather squares is the criterion for determining the effectiveness of the test product. A low-powered microscope is used in settling doubtful cases.

6.2 Interpretation: For an acceptable product every treated square must be free from fungal growth. The results of this test must be correlated to claims made on the label. The directions for use must specify retreatment every 7, 14, or 21 days, depending on the length of time all treated test squares remained free from mildew growth. Products which do not permit growth after four weeks of incubation need not specify retreatment schedules other than "as necessary."

Footnotes

[1] Cultures of *A. niger* (ATCC 6275) may be obtained from American Type Culture Collection, 12301 Parklawn Dr., Rockville, Md. 20852.

[2] Cultures of *P. variabile* NRRL 3765 (formerly classed as *P. glaucum*) are available from: ARS Culture Collection Investigations Fermentation Laboratory, 1815 No. University St., Peoria, Ill. 61604.

[3] Triton X-100, Rohm & Haas Co., Phila., Pa.

[4] For detailed instructions: Tuite, John, *Plant Pathological Methods Fungi and Bacteria*, Burgess Publishing Co., Minneapolis, Minn., 1969, pp. 183–184.

FABRIC, CORDAGE AND FIBERS (ROT, DECAY, MOLD AND MILDEW CONTROL)

Federal Test Method Standard. December 31, 1968. Mildew resistance of textile materials: soil burial method. Method 5762 *in* Textile test methods No. 191. General Services Administration, Washington, D.C.

This soil burial method may be used to support claims for products intended to control rot and decay and mold and mildew of textiles. A product which passes this test will not require testing by the mixed culture method for use on fabrics that will not contact soil.

Federal Test Method Standard. December 31, 1968. Mildew resistance of textile materials: mixed culture method. Method 5760 *in* Textile test methods No. 191. General Services Administration, Washington, D.C.

This test may be used to support rot and decay and mold and mildew claims when the fabric's use will not contact soil. Products which control growth for a 4-wk incubation may specify retreatment "as necessary."

METHOD OF TEST FOR CONTROL OF FABRIC MILDEW BY FUNGISTATS

(This method, TSD Designation 6.203, was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to control, prevent or inhibit the growth of fungi which cause mildew on various articles or surfaces must be tested to demonstrate *fungistatic* effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide and Rodenticide Act of 1972. It is designed to determine effectiveness of products (applied according to instructions on the labeling) to control mildew and nonpathogenic fungal growth on articles or surfaces composed of *fabric*. It also indicates the duration of protection afforded, thereby providing a basis for recommending when to repeat applications.

2. Summary of Method.

2.1 The candidate fungicide is applied to cotton duck strips according to label directions. The strips are dried and inoculated with a standardized spore suspension of *Aspergillus niger* and *Penicillium variabile*. The strips are then suspended over water in jars and incubated at 28 C. The fungal growth is recorded weekly up to four weeks, depending upon label claims. Any variations from the four week test period are noted on the report. If retreatment is required by the label, the strips are retreated according to label directions and so noted in the report.

3. Test Organisms.

3.1 *A. niger* (ATCC 6275). Maintain stock cultures on neopeptone agar [1] or other suitable media. Incubate new stock cultures seven to ten days at 25 C, then store at 2 to 10 C.

3.2 *P. variabile* (NRRL 3765) [2]. Maintain and store as in 3.1.

4. Test Fabric Preparation.

4.1 Cut 25 by 75 mm strips from 238 to 474 g/m^2 (10 to 20 oz/yd^2) single-filled canvas duck. Fabric that will hang without curling excessively is preferable [3].

4.2 Nutrient additive: The number of invalid tests due to failure of mildew growth on the untreated test fabric can be reduced or eliminated by applying a nutrient solution to the fabric. The following is recommended:

4.2.1 For luxuriant growth: Glycerol nutrient solution:

Percent	
98.725	distilled water
1.0	glycerol
0.1	KH_2PO_4
0.1	NH_4NO_3
0.025	$MgSO_4$ 7 H_2O
0.05	yeast extract
	(pH 5.3)

Prepare in a flask with a cotton plug and autoclave at 103 kPa for 20 min.

4.2.2 A sufficient quantity of the above solution should be prepared to saturate all the fabric to be used. Soak the fabric in it for three min, or until saturated [4]. The excess liquid should be expressed with the fingers and the strips dried before being inoculated and placed in an incubator. Apply nutrient additive before application of fungicide.

5. Preparation of Conidial Suspension.

5.1 Place approximately 13 mm of neopeptone agar in a 250-ml Erlenmeyer flask, plug with cotton and autoclave at 103 kPa for 20 min. After cooling inoculate with the desired organism (*A. niger* or *P. variabile*) at the center of each flask and incubate for seven to ten days at 25 C. Prepare a diluent which contains 0.85% NaCl and 0.05% Triton X-100 [5] in distilled water. Autoclave at 103 kPa for 20 min. Pour approximately 100 ml of the cooled sterile diluent over the culture surface and shake vigorously to dislodge the spores. Pour this spore suspension into a heat-sterilized tissue grinder and reciprocate the piston several times to break up spore chains. Filter suspension through a thin layer of sterile absorbent cotton to remove spore chains and hyphal elements. Conidial suspensions may be stored at 2 to 10 C for not longer than four weeks. Standardize test conidial suspensions to contain five million conidia per ml (determine by spore counts with a counting chamber [6]) by adding sterile diluent.

6. Apparatus.

6.1 Glassware: Two 1000-ml Erlenmeyer flasks or other flasks with cotton plugs suitable for preparing agar and for preparing the diluent. Four 250-ml Erlenmeyer flasks with cotton plugs, heat-sterilized, for use in preparing suspension of conidia (for two fungi). Thirty 500cc French square jabs (10 for the treated replications, 10 for the untreated and 10 for the standard fungicide). Prepare the caps by center drilling and inserting 3 mm brass bolts approximately 13 mm in length attaching a 50 to 65 mm piece of #22 nickel chromium wire, bent to form a hook, to suspend the test samples in the jar. The hooks should support the fabric samples so that the lower ends are approximately 13 mm above the water.

6.2 Tissue grinder (Homogenizer) No. 4288B Arthur H. Thomas.

6.3 Atomizer, DeVilbiss #152 (or other suitable atomizer) operated at 69 kPa.

7. Standard Fungicide.

7.1 Prepare a solution of 0.3% o-phenylphenol in 95% ethanol.

7.2 Dip ten fabric strips (from 4.) in the 0.3% o-phenylphenol solution for three min, or spray until wet depending on product being tested, then allow to dry before proceeding with inoculation (8.2).

NOTE: Experience has indicated that if cloth lighter than 238 g/m^2 is used, the concentration of the standard fungicide will have to be increased (0.5% o-phenylphenol in 95% ethanol) to obtain mildew control for four weeks.

8. Procedure.

8.1 Treatment: Ten fabric strips (from 4.) are placed in the use-dilution of the product for three min. With pressurized products, fabric strips are placed on a perforated rubber mat and sprayed according to label directions on both sides with the product. Where label directions do not specify duration of spray, fabric strips should be sprayed until wet, being careful to obtain equal wetting on both sides of the test specimen. This is best done by spraying several light applications alternately to each side of the specimen. Include the ten untreated strips, as controls. All samples are allowed to dry before proceeding with inoculation (8.2).

8.2 Inoculation: Inoculum of *A. niger* and *P. variabile* (5.1) is placed in the DeVilbiss sprayer on a 50:50 basis and thoroughly agitated, then lightly sprayed on both surfaces of the fabric test samples.

8.3 Incubation: The fabric samples are then suspended in individual 500 cc jars containing approximately 25 mm of water, and incubated at approximately 28 C. The caps tightened, then backed off ⅛ turn to allow for some ventilation. Observations are recorded weekly for four weeks, or until abundant growth occurs on treated fabric, or so long as the label claims (7, 14, 21, up to 28 days).

9. Evaluation.

9.1 Visual observations of presence or absence of fungal growth on any of the specimens is the criterion for determining the results of the test. A low-powered microscope is used in determining presence of fungal growth in doubtful cases.

9.2 The results of this test must be correlated to claims to be made on the label or labeling. The directions for use must specify retreatment every 7, 14, or 21 days, as necessary, depending on the length of time that all of the test strips remain free from mildew growth. Products which do not permit growth after four weeks incubation may specify "as necessary".

Footnotes

[1] Neopeptone agar (also known as Sabouraud Agar modified and carried as prepared media by Difco and Baltimore Biological Laboratory) consists of 1% neopeptone, 2% dextrose, 2% agar.

[2] Cultures of *P. variabile* NRLL 3765 (formerly classed as *P. glaucum*) are available from: ARS Culture Collection Investigations Fermentation Laboratory, 1815 North University Street, Peoria, Illinois 61604, or American Type Culture Collection, 12301 Parklawn Drive, Rockville, Maryland 20852.

[3] Single-filled B-grade canvas, 238 to 474 g/m^2 (10 to 20 oz/yd^2) can be obtained from Testfabrics Inc., 200 Blackford Avenue, P.O. Box 53, Middlesex, N.J. 08846, and has been found satisfactory for this purpose.

[4] The glycerol acts as a humectant and consequently tends to provide a more equal distribution of moisture to all areas of the substrate. The glycerol, yeast extract and mineral salts also provide the necessary nutrients for fungal growth.

[5] Triton X-100, Rohm & Haas Co., Philadelphia, Pa., or other suitable non-ionic wetting agent such as dioctyl sodium sulfosuccinate, Fischer Scientific Co., as Aerosol OT solid A-349.

[6] For detailed instructions: Tuite, John, *Plant Pathological Methods Fungi and Bacteria*, Burgess Publishing Co., Minneapolis, Minn., 1969, pp. 183–184.

TEST METHOD FOR EVALUATING MILDEWSTATS ON HARD SURFACES

(This method, TSD Designation 6.201, was prepared by Technical Services Division, OPP, EPA, and is being considered by the American Society for Testing and Materials. The ASTM format has been retained.)

1. Scope.

1.1 Products which are intended for use to control, prevent or inhibit the growth of fungi which cause mildew on various articles or surfaces must be tested to demonstrate, *fungistatic* effectiveness. This test is designed to determine effectiveness of products (applied according to instructions on the labeling) to control mildew and non-pathogenic fungal growth on hard surfaces such as painted walls, ceilings, floors, metal, glass, tile, porcelain, and plastic.

2. Summary of Method.

2.1 The test is conducted by taking 6.45 cm^3 (1 in. square) glazed tile sections, previously cleaned and sterilized, immersing them in or spraying them with the candidate fungistatic agent, drying; lightly spraying with an inoculum-food solution, redrying, then incubating under optimum moisture and temperature conditions for one week and rating fungal growth on treated and untreated surfaces.

3. Apparatus.

3.1 Glassware: Two 1000 ml Erlenmeyer flasks or other flasks with cotton plugs which are suitable for preparing agar and for preparing the diluent. The 250 ml Erlenmeyer flasks with cotton plugs, heat-sterilized, for use in preparing suspensions of conidia. Twenty-four sterile petri plates (10 for the treated replications, 10 for the untreated, 4 for oven drying).

3.2 Tissue grinder (Homogenizer): No. 4288B, Arthur H. Thomas C.

3.3 Atomizer: DeVilbiss #152 (or equivalent) operated at 68.95 kPa (10 psi).

3.4 Ceramic tiles: Thirty 6.45 cm^2 (1-in.-square) tiles with glazed upper surface, sterilized for 2 h in hot air oven at 180°C (356°F).

4. Test Fungus and Materials.

4.1 Recommended test organism: *Aspergillus niger* (ATCC 6275). Maintain stock culture on neopeptone agar.[1] Incubate new stock cultures 7 to 10 days at 25°C (77°F), then store at 2 to 10°C (35.6 to 50°F).

4.2 Choice of test fungus may vary depending upon label claims of product being tested. If control of fungi other than *A. Niger* is claimed on product label, use of any other mildew fungus is permissible provided genus and species of test organism are stated. Prepare spore suspensions of all test fungi in the same manner (5.1).

4.3 Agar: Two percent water agar (20 g agar per liter water).

4.4 Sterile Czapek solution: Distilled water 1000 ml; Sodium nitrate 3.g; Potassium dibasic phosphate 1 g; Potassium chloride 0.5 g; Magnesium sulphate 0.5 g; Ferrous sulphate 0.01 g; Sucrose 30 g.

5. Procedure.

5.1 Preparation of Conidial Suspension: Place approximately 12.7 mm (½ in.) neopeptone-dextrose agar into 250 ml Erlenmeyer flask, plug with cotton and autoclave at 103.42 kPa (15 psi) for 20 min. Seed *A. niger* inoculum at the center of the flask and incubate for 7 to 10 days at 25°C (77°F). Prepare a diluent which contains 0.85 percent sodium chloride and 0.2 percent Triton X-100 in distilled water. Autoclave at 103.42 kPa (15 psi) for 20 min. Pour approximately 100 ml of cooled sterile diluent over the culture surface and shake vigorously to dislodge the spores. Pour spore suspension into a tissue grinder which has been heat-sterilized, reciprocate piston several times to break up spore chains. Filter suspension through a thin layer of sterile absorbent cotton to remove spore chains and hyphal elements. Conidial suspensions may be stored at 2 to 10°C (35.6 to 50°F) for not longer than four weeks. Standardize conidial suspensions to contain five million conidia per ml. Determine spore concentration using a counting chamber and adjust to proper concentration with sterile diluent. To prepare test suspension, place 1 ml of the standard conidial suspension in 20 ml sterile Czapek's liquid medium and agitate.

NOTE: Superscript arabic numbers refer to information footnotes at the end of the paper.

5.2 Standard Fungicide.

5.2.1 Prepare a solution of 0.2 percent o-phenylphenol in 95 percent ethanol.

5.2.2 Place ten tiles in the Standard fungicide (5.2.1) for 3 min. Drain off excess liquid. Place five tiles in each of two sterile petri dishes and dry for 40 min. (longer if necessary) at 37°C (98.6°F) with lids ajar.

5.3 Treatment: Place ten tiles in use-dilution of test product for 3 min. Drain off excess liquid. Place five tiles in each of two sterile petri dishes and dry for 40 min. (longer if necessary) at 37°C (98.6°F) with lids ajar. For pressurized products, tiles are placed glazed surface up on a perforated rubber mat and sprayed for specified time at recommended distance. Tiles are then drained, placed in sterile petri dishes and dried as described above.

5.4 Inoculation: After drying, tiles are lightly sprayed on glazed surface with *A. higher*-nutrient suspension as previously described. Avoid overspraying to prevent puddling and washing test product from glazed surface. Tiles are then returned to 37°C (98.6°F) oven and dried with petri dish lids ajar. Ten sterile untreated tiles are inoculated and dried in same manner.

5.5 Incubation: Each tile, sprayed side up, is placed in an individual petri dish containing hardened 2 percent sterile water agar. To avoid large water droplets, usually formed by the heavy condensate on petri dish lids when hot agar is poured, from falling onto the tile surface and diluting the product: (1) Allow the plates to stand and dry for several days before they are used in a test; (2) exchange the wetted lids with sterile dry lids; or (3) seal the tile to the agar surface by placing melted agar around its periphery, then turn the plate upside down. Plates are incubated (preferably in a wet-type incubator) at 25°C (77°F) for seven days.

6. Interpretation of Results.

6.1 Visual observation of presence or absence of mold or fungal growth on tiles is the criterion for determining the effectiveness of the test product. A low-powered microscope is used in settling doubtful cases. Each check tile must be at lease 50 percent covered with fungal growth to consider the test valid. A product is considered to pass the test if no growth appears on any of the treated tiles at the end of seven days incubation. Products qualifying under this test must bear adequate directions for use, including a statement to repeat application when new growth appears, and naming some of the appropriate hard surfaces (such as walls, ceilings, floors, and counter tops) on which it is intended to be used.

Footnotes

[1] Neopeptone agar composed of 1 percent neopeptone, 2 percent dextrose, 2 percent agar.

METHOD OF TEST FOR CONTROL OF WOOD MILDEW BY FUNGISTATS

(This method, TSD Designation 6.204, was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society of Testing and Materials.)

1. Scope.

1.1 Products intended for use to control, prevent or inhibit the growth of fungi which cause mildew on various articles or surfaces must be tested to demonstrate *fungistatic* effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Environmental Pesticide Control Act of 1972. It is designed to determine effectiveness of products (applied according to instructions on the labeling) to control mildew and non-pathogenic fungal growth on articles or surfaces composed of wood which has *not* been painted or coated (a common cause of musty odors in basements and attics). It also indicates the duration of protection afforded, thereby providing a basis for recommending when to repeat applications. Its use will expedite registration and minimize enforcement actions. This test is not satisfactory to support claims to control rot and decay of wood.

2. Summary of Method.

2.1 The candidate fungicide is applied to wood blocks, following label directions. After drying, the blocks are inoculated with a mixed spore suspension of *Aspergillus niger* and *Penicillium variabile*. The blocks are incubated over water in jars at 28 C for four weeks after which the presence or absence of mold growth is recorded.

3. Test Organisms.

3.1 *Aspergillus niger* (ATCC 6275). Maintain stock cultures on neopeptone agar (10 g neopeptone, 20 g dextrose, 20 g agar, and 1000 ml distilled water). Incubate new stock cultures seven to ten days at 25 C, then store at 2 to 10 C.

3.2 *Penicillium variable* (NRRI 3765)[2] Maintain and store as in 31.1.

4.1 Ponderosa pine (*Pinus ponderosa* Laws.) sapwood blocks approximately 2.5 by 2.5 by 1.5 cm. The wood shall be free of excessive resins, knots, growth rings or other abnormalities. Blocks shall be surfaced on four sides and smooth. Wood shall be kiln dried after sawing to avoid infestation of wood rotting fungi and any wood showing evidence of such infestation shall be eliminated as test material. Condition wood at room temperature in a dry room to 15% moisture content before weighing. Calculated weight shall fall between 6.0 and 7.0 g per 16 cm^3 (1 in.^{3}). Blocks containing heartwood areas shall not be used as they will inhibit mold growth under test conditions. Each block is corner drilled to allow hanging of blocks as in 6.1, or other means of hanging can be used.

5. Preparation of Conidial Suspension.

5.1 Pour approximately 50 ml neopeptone agar into 250-ml Erlenmeyer flask, plug with cotton and autoclave at 103 kPa for 20 min. Seed the desired organism (*A. niger* or *P. variabile*) at the center of each flask and incubate for seven to ten days at 25 C. Prepare a diluent which contains 0.85% NaCl and 0.05% dioctyl sodium sulfosuccinate[3] in distilled water. Autoclave at 103 kPa for 20 min. Pour approximately 100 ml of the cooled sterile diluent over the culture surface and shake vigorously to dislodge the spores. Pour this spore suspension into a tissue grinder, heat-sterilized, and reciprocate the piston several times to break up spore chains. Filter suspension through a thin layer of sterile absorbent cotton to remove spore chains and hyphal elements. Conidial suspensions may be stored at 2 to 10 C for not longer than four weeks. Standardize test conidial suspensions (1) to contain five million conidia per ml (determine by spore counts with a counting chamber) by adding sterile diluent.

6. Apparatus.

6.1 Glassware: Two 1000-ml Erlenmeyer flasks or other flasks with cotton plugs suitable for preparing agar and for preparing the diluent. Four 250-ml Erlenmeyer flasks with cotton plugs, heat-sterilized, for use in preparing suspension of conidia (for two fungi). Thirty 500 cc French square jars (10 for the treated replications, 10 for the untreated, and 10 for the Standard Fungicide). These are prepared by center drilling the caps and inserting 3 mm brass bolts approximately 13 mm long for attaching a 63 mm piece of #22 nickel chromium wire. The wire is bent to form a hook on the end and is used for suspending the test samples in the jar. The length of the hook from the bottom of the cap to the bottom of the hook shall be 51 ± 6 mm.

6.2 Tissue grinder (Homogenizer) No. 4288B Arthur H. Thomas.

6.3 Atomizer, DeVilbiss #152 (or other suitable atomizer) operated at 69 kPa.

7. Standard fungicide.

7. Prepare a solution of 0.5% pentachlorophenol[3] in 95% ethanol.

7.2 Dip ten untreated blocks in the 0.5% pentachlorophenol solution for three min and allow to dry before proceeding with the next step (8.2).

7.3 When testing pressurized products spray Standard fungicide blocks, in a hood, on all sides with the solution (7.1) using an atomizing sprayer and allow to dry before proceeding.

8. Procedure.

8.1 Treatment: Ten untreated blocks are dipped in the use-dilution of the product for three min. With pressurized products, blocks are placed on a perforated rubber mat where they are sprayed, according to label directions, on all sides with the product. Where label directions do not specify duration of spray, blocks should be sprayed until wet, being careful to obtain equal wetting on all sides of the test specimen. This is best done by spraying several light applications alternately to each side of the specimen. Include the ten untreated blocks as controls. All samples are allowed to dry before proceeding to the next step.

8.2 Inoculation: Inoculum of *A. niger* and *P. variabile*, prepared as previously described, is placed in the DeVilbiss sprayer on a 50:50 basis and thoroughly agitated, then sprayed lightly on all surfaces of the test blocks.

8.3 Incubation: The blocks are then hung in individual 500 cc jars containing approximately 25 mm of water, and incubated at approximately 28°C. The caps are tightened, then backed off ⅛ turn to allow for some ventilation. Observations are recorded weekly for four weeks or until abundant growth occurs on treated blocks.

9. Evaluation.

9.1 Visual observation of mold or absence of mold on any of the specimens is the criterion for determining the results of the test. A low-powered microscope is used in settling doubtful cases. The untreated control blocks must have a minimum of 50% fungal coverage to consider the test valid.

9.2 The results of this test must be correlated to claims made on the label or labeling. The directions for use must specify retreatment every 7, 14, or 21 days, as necessary, depending on the length of time that all of the test blocks remain free from mildew growth. Products which permit growth after four weeks incubation may specify retreatment "as necessary".

Footnotes

[1] Cultures of *P. variabile* NRRL 3765 (formerly classed at *P. glaucum*) are available from: ARS Culture Collection Investigations Fermentation Laboratory, Northern Utilization Research and Development Division, 1815 North University Street, Peoria, Illinois 61604, or American Type Culture Collection, 12301 Parklawn Drive, Rockville, Maryland 20852.

[2] AEROSOL OT A-349, Fischer Scientific Co., has been found suitable for this purpose.

[3] Baker pentachlorophenol, technical grade, has been found satisfactory for this purpose.

Literature Cited

(1) Tuite, John, *Plant Pathological Methods Fungi and Bacteria*, Burgess Publishing Co., Minneapolis, Minn., 1969, p. 183–184.

WOOD PRESERVATIVES (ROT AND DECAY)

American Wood-Preservers' Association. 1955. Standard method for field tests with stakes. AWPA Method M7-55 *in* AWPA Manual of Recommended Practice.

Separate tests should be conducted for each method of application (pressure, dip, brush, spray, etc.).

American Wood-Preservers' Association. 1956. Standard method for field tests with posts. AWPA Method M8-56 *in* AWPA Manual of Recommended Practice.

Separate tests should be conducted for each method of application (pressure, dip, brush, spray, etc.).

American Society for Testing and Materials. 1974. Standard method of evaluating wood preservatives by field tests with stakes. ASTM Designation: D1758-74.

This method should be used only for pressure methods of application.

INDUSTRIAL PRESERVATIVES

Surface Unspecified or General. American Society for Testing and Materials. 1970. Standard recommended practice for determining resistance of synthetic polymeric materials to fungi. ASTM Designation: G21-70.

This procedure is limited to materials into which a pesticide is incorporated during the manufacturing process.

Coatings-Interior Paints. American Society for Testing and Materials. 1973. Tentative method of test for resistance to growth of mold on the surface of interior coatings in an environmental chamber. ASTM Designation: D3273-73T.

PAPER AND PAPERBOARD

Vinson, L. J. May 1953. The Lever spore cloud method for the evaluation of antimycotic properties of paper and paperboard used in the soap industry. TAPPI 36(5):234–236.

This method may be used for determining the effectiveness of fungicides applied at the dry end of paper and paperboard manufacture. If the paper or paperboard is intended for uses other than the soap industry, the test may be modified by using other organisms.

USE-DILUTION MILDEW FUNGICIDAL TEST METHOD

(This method, TSD Designation 6.206, was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill fungi which cause mold and mildew growths must be tested to demonstrate "cidal" effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Environmental Pesticide Control Act of 1972. It is suitable only to determine effectiveness to *kill* mildew organisms (applied according to label directions). Residual effectiveness, if intended or claimed, must be demonstrated using different tests depending on the nature of the surfaces or articles on which the product is to be used. This method is especially applicable for testing products which are applied after dilution with water. Its use will expedite registration and minimize enforcement actions.

2. Reagents and Materials.

2.1 Purity of water. Unless otherwise specified, reference to water shall be understood to mean distilled water or water of equal purity.

2.2 Culture Medium. Neopeptone-neutralizer broth. Prepare by dissolving 0.7 g lecithin (Asoletcing) and 5.0 g "Tween 80" (sorbitan mono-oleate) in 400 ml of hot water and boiling until dissolved. Add 1.0 g sodium thiosulfate, 10 g neopeptone and 20 g dextrose. Adjust to pH 7.2 ±0.2 using tris buffer (2.2.1), and bring volume to one litre with water and mix thoroughly. Place 10 ml of this medium in cotton-plugged 25 by 150 mm test tubes for sterilization and use. Autoclave at 103 kPa (15 psi) for 20 min.

2.2.1 Tris buffer stock solution: 0.1M. Dissolve 12.1 g tris (hydroxymethyl) aminomethane in 500 ml water and bring to one litre. Approximately 70 ml of this buffer solution is placed in 1 litre of the culture medium, then agitated thoroughly and distributed to test tubes, etc. The pH of the medium will be approximately 7.4 before autoclaving and 7.2 after autoclaving.

2.3 Test Organism. Aspergillus niger (ATCC 6275). Maintain stock cultures on neopeptone agar (10 g neopeptone, 20 g dextrose, 20 g agar, and 1 litre water). Incubate new stock culture 7 to 10 days at 25°C, then store at 2° to 10°C. Conidia of required resistance survive 10-min exposure at 20°C to a phenol dilution of 1:80 (2 parts 5% phenol, 6 parts water), but not to a 1:70 dilution (2 parts 5% phenol, 5 parts water).

2.4 Phenol: Use 5% stock solution and keep in well-stoppered amber bottle, in a cool place, protected from light. [A standard stock solution to be prepared by a qualified chemist: AOAC Manual, 11th Edition. 4.001 (c)].

2.5 Sterile distilled water. Prepare stock supply of distilled water in litre flasks, plug with cotton, and autoclave at 103 kPa for 20 min.

2.6 Asparagine solution: Make stock supply of 0.1% asparagine solution in water in Erlenmeyer flasks of convenient size, plug with cotton, and autoclave at 103 kPa for 20 min. Use to cover metal carriers for sterilization and storage.

2.7 Sodium hydroxide solution: Approximately 1 N (4%). (For cleaning metal carriers before use.)

3. Preparation of Conidial Suspension.

3.1 Place approximately 13 mm (½ in.) of neopeptone agar into a 250 ml Erlenmeyer flask, plug with cotton and autoclave at 103 kPa for 20 min. Seed *A. niger* at the center of the flask and incubate for 7 to 10 days at 25°C.

3.2 Prepare a diluent which contains 0.85% NaCl and 0.2% Triton X-100 in distilled water. Autoclave at 103 kPa for 20 min.

3.3 Pour approximately 100 ml of the cooled sterile diluent over the culture surface and shake vigorously to dislodge the spores. Pour this spore suspension into a tissue grinder, heat-sterilized, and reciprocate the piston several times to break up the spore chains. Filter suspension through one-half layer sterile absorbent cotton to remove spore chains and hyphal elements.

3.4 Conidial suspensions may be stored at 2 to 10°C for not longer than four weeks.

3.5 Standardize test conidia suspensions to contain five million conidia per ml by adding sterile diluent (3.2).

3.6 Determine by spore counts with a counting chamber.[1]

NOTE.—Superscript arabic numbers refer to information footnotes at the end of the paper.

4. Apparatus.

4.1 Glassware: Twenty-four lipless 25 by 150 mm test tubes with cotton plugs. Six petri plates 15 by 100 mm with filter paper. Two 250 ml and one 1000 ml Erlenmeyer flasks with cotton plugs. Sterilize all glassware two h in hot air oven at 180°C.

4.2 Transfer needle: A 5 to 8 cm Pt. alloy wire, No. 18 to 23 B & S gauge. Make 5 mm right angle bend at end of wire and fit other end into suitable holder.

4.3 Racks and Baskets: Any convenient style.

4.4 Water Bath: A suitable water bath for maintaining 20°C for the exposure period of the product.

4.5 Carriers: Polished Cylinders (Penicillin Cups), 8±1 mm o.d., 6±1 mm i.d., length 10±1 mm of type 304 stainless steel[2].

4.6 Tissue ginder: (Homogenizer) No. 4288B, Arthur H. Thomas.

5. Operating Technique.

5.1 Soak metal carriers (4.5) overnight in 1 N NaOH (2.7), rinse with tap water several times, than rinse twice with distilled water; place cleaned carriers in multiples of ten in 25 by 150 mm test tubes with closures (or cotton plugs) and cover with asparagine solution (2.6). Sterilize at 103 kPa for 20 min, cool, and hold at room temperature. When the carriers are cooled, pour off the asparagine and cover with standard spore suspension of *A. niger* (3). and allow to stand 10 min. Pour off the spore suspension and remove the metal carriers and place them (ten each) in a sterile petri plate matted with filter paper. Allow them to dry overnight at room temperature or place them in an oven or incubator at 37°C for 2 h with the lids ajar. Place 10 ml of the use-dilution of the product in each of ten, 25 by 150 mm test tubes with closures. Place 10 mm of sterile distilled water in each of two, 25 by 150 mm test tubes with closure for the viability control (untreated checks). All test tubes are placed in a suitable rack and submerged in a water bath so as to cover the lower 2 in. of the tubes. Allow the tubes to come to temperature equilibrium at 20°C, then place the metal carriers in the test tubes at 30 sec intervals. When the carriers have been in contact with the product for 10 min, remove them with a flamed needle in a manner so as to drain all excess liquid from the carriers and place them individually in 25 by 150 mm test tubes containing 10 ml of neopeptone neutralizer broth (2.2). Immediately after placing carriers in test tubes, swirl tubes 3 times. Incubate all tubes at 25°C for at least three days before evaluating for the presence of fungal growth. Negative readings in ten out of ten replications are considered satisfactory evidence of fungicidal activity of the product. The viability control should read positive in both untreated replications.

6. Interpretation.

6.1 The results of this test must be correlated to claims to be made on the label or labeling. Products which pass this test may be labeled as fungicides or mildewcides which will kill or destroy mold and mildew organisms. However, if the product does not have residual effectiveness, the labeling must state "non-residual" or "destroys on contact only".

Footnotes

[1] For detailed instructions: Tuite, John. 1969. *Plant Pathological Methods Fungi and Bacteria*. pp. 183–184.

[2] Fisher Scientific Company, 7722 Fenton Street, Silver Spring, Maryland 20910.

SUBPART D

Product performance: Terrestrial herbicides and plant growth regulators IV.D-1
  Terrestrial herbicides IV.D-2
    Testing phases IV.D-2
    Herbicide application IV.D-3
    Other considerations (crops, cultural practices, soil and climatic factors) IV.D-5
    Measuring plant responses IV.D-6
  Plant growth regulators IV.D-8
    Control of axillary bud (sucker) growth on tobacco IV.D-9
    Control of potato tuber sprouting IV.D-20
    Control of branch angle in young trees IV.D-23
    Control of alternate bearing in apples IV.D-25
    Control of sex expression in cucumbers and squashes IV.D-27
    Control of fruit maturation and ripening IV.D-30
    Control of fruit abscission IV.D-33
    Increased berry size of seedless varieties of table grapes IV.D-37
    Loosen compact clustered varieties of *vitis vinifera* (wine grapes) IV.D-38
    Acidity reduction in citrus IV.D-40
    Apple scald inhibitors IV.D-42

PART IV.—PRODUCT PERFORMANCE

SUBPART D.—TERRESTRIAL HERBICIDES AND PLANT GROWTH REGULATORS

Pesticides in this group are numerous and extremely diverse in their physical and chemical properties. Moreover, they are applied differently under practical use situations in the field and interact variably with the environment once introduced into the biosphere. These factors directly influence both biological performance (efficacy as a regulator) and residual life (dissipation or persistence).

Test methods for these pesticides also, necessarily, vary widely. For herbicides, currently by far the most important category economically, test methods are almost as numerous as researchers in the area of weed science. For some of the more subtle, less definitive, uses of plant growth regulators, however, there is a paucity of published reports on test methods or protocols. Testing under actual field conditons remains the only acceptable method for evaluating the performance of plant regulators.

Distinct limitations may be noted in this subpart. For example, in the section, "Terrestrial Herbicides," priority is given largely to products that are used selectively in croplands. Herbicidal uses on noncropland and industrial sites are not included. Neither are the uses of herbicides in forests and in specialty home and garden situations discussed. Herbicides for aquatic uses are discussed in Part IV. Subpart B., "Aquatic Pest Control Agents." Desiccants and defoliants are also omitted.

The discussion of plant growth regulators is not fully comprehensive. Attention has been given to a few uses that are representative of products presently being marketed. This category in particular will need to be expanded in future revisions.

TERRESTRIAL HERBICIDES

Methods reported in the literature for testing the effectiveness of herbicides vary with the compound, crop, location, application equipment, type of supplemental cultural practices and/or other factors. In general, multiple test methods are required to prove the effectiveness of a given compound. The methods selected should test the compound in the manner in which it is to be used and in a manner which will show the effect of field variables on the compound's effectiveness. The data obtained should support the product label claims and should be representative of the results that the grower will obtain from commercial usage of the product.

Cropland herbicides may be applied as preplant, preemergence and/or postemergence applications. The terminology used in reference to such applications *in this discussion* of test methods is defined below:

1. *Preplant application.* An application of a herbicide made before planting the crop to control weeds, either before or after the weeds emerge. The interval between the herbicide application and crop planting and the stage of weed growth at the time of application should be identified.

2. *Preemergence application.* An application of a herbicide made after planting and before emergence of the crop to control weeds, either before or after the weeds emerge. The interval between the planting of the crop and the herbicide application and the growth stage of the weeds at the time of application should be identified.

3. *Postemergence application.* An application of a herbicide made after the emergence of the crop to control weeds, either before or after they emerge. The interval between crop emergence and application should be identified in terms of time or crop growth stage. The growth stage of the weeds at the time of application should also be identified.

Testing Phases. Field trials with herbicides to obtain data to show product effectiveness and usefulness and to support label claims can be divided into the 4 test sequences or phases described below:

1. Trials designed to show product effectiveness and to demonstrate the effect of field variables on effectiveness. Trials in this phase should be designed to study those variables encountered under actual commercial use conditions that might influence the product's effectiveness. In this phase, trials may consist of small, replicated plots in 2 or more selected test sites. Trials should be designed to provide data which can be subjected to statistical analysis.

2. Trials designed to confirm product effectiveness and to develop specific label claims. These trials are similar in design to those in phase 1, but the number of test sites are increased to represent more adequately the major production areas of the test crop and the introduced variables are emphasized less. As soon as sufficient data are available to support a specific label claim, the product should be used in accordance with that claim in subsequent trials. When sufficient data are available to support all label claims, except those requiring large-scale trails, this phase is completed.

3. Trials designed to show product usefulness when used in accordance with label claims. This phase includes specific studies to determine the effect of the product upon man, his environment or his food when used according to directions and cautions on the label. A discussion of these studies is covered in Part VI. Environmental Chemistry and Part VII. Hazard Evaluation of this appendix.

4. Trials designed to confirm product effectiveness and usefulness when used in accordance with label claims under actual commercial use conditions. Trials in this phase should be conducted under actual commercial use conditions, that is, with grower equipment, under grower cultural practices and in normal crop production or use areas. Test sites should be representative of each State or geographical area in the major production or use areas and should be representative of the different growing seasons in each area. Plots may or may not be replicated, but they should be large enough to reflect actual commercial use responses; for example, the elimination of small plot effects, the introduction of soil type variables and the introduction of pest incidence variables. This phase may also be used to obtain data to support additional label claims such as aerial and mist blower applications.

The investigator should make a major effort to use methods or procedures in Phases 1 and 2 that will provide data which can be directly correlated with the results obtained in phase 4.

Herbicide Application. Wiese (1972) discusses the importance of precise and uniform application of herbicides, along with the equipment, techniques and procedures required to obtain such application. The prime consideration in the application of herbicides, whether in small plot or large-scale trials, is uniformity of compound distribution and coverage. This is true in preplant, preemergence and postemergence applications.

The application equipment used in testing herbicides in small plots in phase 1 or 2 should be designed to simulate grower equipment. This can be readily accomplished by using the basic components of commercial application equipment in the design of the small-plot equipment. For example, nozzle types, sizes and arrangements can be identical to those used by growers for ground sprayers and should produce comparable results; or single-row commercial granular application equipment mounted on a garden tractor for small-plot trials should produce results comparable to a multiple of such units on a larger tractor. For large-scale trials in phase 4, commercial application equipment should be used. The importance of the number of gallons of diluent used in the application of herbicides depends upon the product and its use. In applications made to the soil before the emergence of the weeds, gallons of diluent used per acre may not be critical. Uniform coverage is the prime consideration and is directly related to the application equipment. In applications made to emerged weeds, where coverage of the foliage is required, the gallons of diluent required depends upon both the application equipment and the density of the weed foliage. For these latter uses, gallons of diluent required should be included as a study item, particularly in phase 1. A gallonage range that is adaptable to the commercial equipment for the particular application should be used.

The quantity of the product used per given area depends largely upon the product and the weeds to be controlled, along with the residual effect desired. Dosage rates should be tested in phase 1 to select an optimum range. In subsequent testing, rates above and below the optimum rate should be tested; the higher rate should indicate the crop safety margin and the lower rate should indicate the minimum effective rate. Test rates in phase 4 should be in accordance with label claims.

Trials should be designed to provide data to support the optimum number and timing of applications for effective control and for crop safety. For preplant applications, the interval between the herbicide application and crop planting should be studied in phase 1 as a variable. For preemergence applications, the interval between the planting of the crop and the herbicide application should be studied. For postemergence applications, the interval between crop emergence and application should be studied in terms of time or crop growth stage.

Appropriate commercial standard herbicides at label rates, along with untreated controls, should be included in all phase 1 and 2 trials. Weedy and/or cultivated checks may be used as the untreated controls. The use of both types of checks is suggested if cultivation is required for supplementary weed control. In large-scale phase 4 trials, the commercial standard in use by the grower should be included. An untreated control is desirable.

OTHER CONSIDERATIONS

Crops. Selected major varieties and types representative of the crop should be included in phase 1 trials. In selecting varieties and types, the investigator should consider those which cover the range of growth characteristics for the crop that might affect the compound's activity; for example, weak versus strong rooted, fast versus slow growing and early versus late maturity. If no varietal response to the compound is shown in these early trials, the varietal choice in subsequent phases is not critical and the investigator can use those varieties most adaptable to his test site. If a varietal response is noted in phase 1 trials, subsequent trials should include varieties and types as a variable.

The planting rate should be within the range recommended for the crop in the particular test area. Row spacings common to the crop in the test area should normally be used. For some crops, it may be desirable to include the extremes in recommended row spacings to study shading effects. A range of planting depths within the range recommended for the crop should be included in phase 1 studies with preplant and preemergence applications. Data obtained from these trials should reflect any effects of varying planting depths on the incidence of crop injury that might be encountered under commercial use conditions. In subsequent trials, commercial planting equipment at recommended depth settings should be used. If planting depth is found to be a critical variable, crop emergence and crop injury ratings should be taken from all trials.

Cultural Practices. Cultural practices for a given crop vary from production area to production area and frequently from grower to grower within an area. The effects of cultural practices on the product's effectiveness, therefore, are important.

Selected methods of seed-bred preparation common to the test crop should be studied. In phase 1 trials, it is suggested that such methods cover the extremes from poorly to well prepared seed-beds to study effects of clods and plant debris on product effectiveness. These extremes should be within the limits normally encountered by growers. If seed-bed preparation does not affect weed control in these early trials, the seed-bed preparation in subsequent trials is not critical.

Cultivation practices should be those common for the crop in the test site. Since many crops are being grown under minimum tillage practices, it may be desirable in phase 1 trials to determine the effectiveness, both initial and residual, of the product without cultivation. If cultivation is required to supplement the product's effectiveness, subsequent trials in phase 2 should be designed to show the effects of the product used without cultivation, the effects of cultivation only and their combined effects. Some cultivation practices may reduce the effectiveness of the product through movement of untreated soil; these should be recognized and studied as variables. Trials in phase 4 will be influenced by the investigators' choice in grower cooperators. Cooperators should be selected who are knowledgeable in the crops, pests and land management practices reflected in the label claims to be supported.

Irrigation practices should be studied as a variable if the product is to be used in irrigated area. The influence of different irrigation practices must be studied in the use area and is best studied, therefore, in phase 2 or 4.

Normally, fertilization practices are not a consideration in testing herbicides and should be within the range recommended for the crop in the test site.

Soil and Climatic Factors. Selected soil types available within test sites in phase 1 should be included in trials with preplant, preemergence and postemergence applications, especially where the product is used primarily for preemergence weed control. In subsequent trials, in phases 2 and 4, soil types should be considered in choosing test sites. Variations in soil types at a given site also should be a consideration in phase 4, and rating of weed control and crop safety should reflect the effects of these variations.

Records of adverse climatic conditions and the influence of rainfall and temperature on the effectiveness of the product should be maintained in all trials. Test sites chosen for phases 2 and 4 should be representative of the use areas and use seasons and should provide the data required to show the relationship between rainfall and/or temperature and product effectiveness.

Measuring Plant Responses. Frans (1972) discusses plot designs and field evaluation procedures along with statistical treatment. For registration purposes, adequate counts and/or ratings should be taken to show the effectiveness of the compound against individual weed species and to show crop safety. For preplant and preemergence applications, data should be taken on crop emergence, stand, crop injury and weed control. Periodic ratings should be taken to reflect time and percent emergence. The data on crop injury and weed control should show initial and final responses, with sufficient ratings in between to show progression or regression of symptoms. Similar data on crop injury and weed control should be taken for postemergence applications. Whenever possible, the crop injury or weed control data should be interpreted in terms of "acceptability;" this can be done by reference to the commercial standard or to the untreated control, or by reference to accepted rating systems, such as yield and quality (grades) of the produce.

References

Frans, R. E. 1972. Measuring plant responses. Pages 28–41 *in* R. E. Wilkinson, ed. Research Methods in Weed Science. S. Weed Sci. Soc. POP Enterprises, Atlanta, Georgia. 198 pp.

Wiese, A. F. 1972. Herbicide application. Pages 1–26 *in* R. E. Wilkinson, ed. Research Methods in Weed Science. S. Weed Sci. Soc. POP Enterprises, Atlanta, Georgia. 198 pp.

PLANT GROWTH REGULATORS

Many bioassay, laboratory and greenhouse methods have been published for the detection of chemicals which modify plant growth. Only a few published methods are available, however, for evaluating the potential commercial utility of these chemicals under field conditions.

Testing under actual field conditions remains the only acceptable method for evaluating the efficacy of potential plant regulators. Because responses obtained with plant regulators cover such a wide range, for example, bud inhibition, berry size increase, fruit coloring, specific field test methods are outlined. These are based to a large extent on methods employed to evaluate the efficacy of growth regulators presently marketed. New methods and protocols for evaluating plant growth regulators are continually being developed because both new uses and new chemicals are being sought. In all cases, however, data obtained from field tests must support the label claims for the product and must be representative of the results that the producer can expect when the product is used in accordance with label instructions under commercial conditions.

CONTROL OF AXILLARY BUD (SUCKER) GROWTH ON TOBACCO

Plant growth regulating chemicals have been developed which prevent the growth of suckers. These growth inhibiting chemicals may be divided into 2 types: Systemic and contact. The systemic regulators are applied as sprays to leaves, are absorbed by the plant and are translocated throughout the plant, but especially to the meristematic areas of the axillary buds. The contact type sucker control chemicals are also applied as sprays but are directed down the stalk so that they contact the axillary buds. They kill the small suckers without damaging more mature leaf tissue. Test methods and factors affecting the efficacy of various tobacco sucker control agents have been discussed in a number of publications (Collins et al., 1972; Seltmann and Priest, 1972; Seltmann and Marshall, 1967; Smith et al., 1971; Steffens et al., 1969a; Steffens et al., 1969b; and Spaulding et al., 1970).

The Regional Tobacco Growth Regulator Committee, composed of State and Federal researchers, extension workers, representatives of tobacco and chemical industries and representatives of the Environmental Protection Agency, have worked together to evaluate new plant growth regulating chemicals potentially useful in tobacco production. Two types of field tests are conducted annually, usually at 15 locations in 10 States. Tobacco is evaluated with respect to efficacy of treatment, agronomic characteristics, commercial useability, chemical and physical properties and smoke taste. Samples of known history are made available for assessment of residues of applied chemicals.

The flow chart (Figure 1) summarizes the progression of tests established. After each test, the Committee will evaluate the date to determine if any entry is eligible for the next test in the progression. After company proprietary tests, the Committee makes recommendations to the Environmental Protection Agency regarding label registration.

APPENDIX TO GUIDELINES FOR REGISTERING PESTICIDES

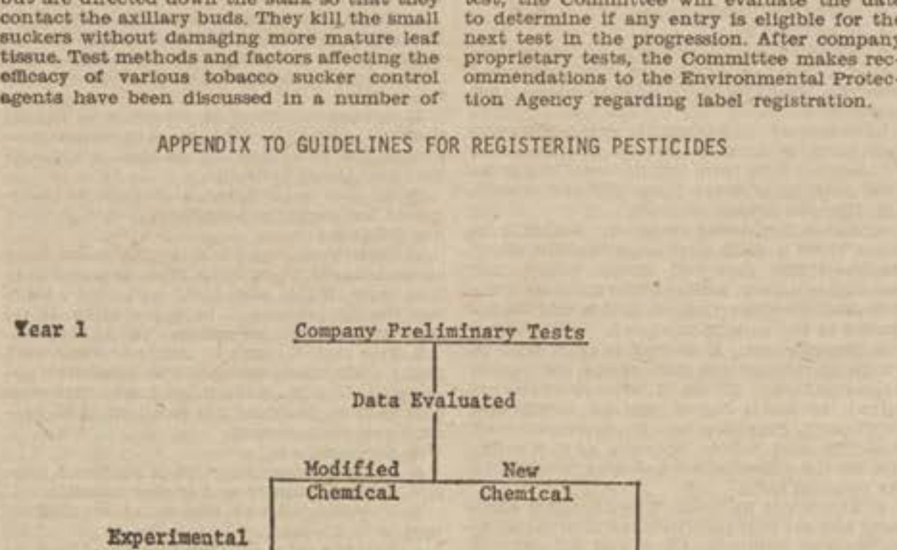

Figure 1. Testing Schematic for Tobacco Sucker Control.

App. IV.D-10

TEST CHEMICALS

New Chemicals. These include structures, mixtures or sequential treatments of chemicals not previously tested. Two or more chemicals to be treated in sequential applications will be considered "one" treatment. If sequential treatments involve 2 new chemicals or one new chemical and one which has already been passed by the Committee, the treatment will be considered a new chemical.

Modified Chemicals. These include formulations of previously approved chemicals which have been slightly altered (salt form, surfactant, etc.). The company submitting the chemical must supply data to indicate if the entry is to be considered a modified chemical.

TYPES OF TESTS AND TEST METHODS

There are 4 sequential levels of testing: company preliminary tests; regional preliminary tests; regional advanced tests; and company proprietary tests.

Company Preliminary Tests. These tests are field trials conducted by chemical companies to compile data to justify entry of a chemical into the regional testing program. The test requirements include:

1. Minimum of 2 flue-cured and 2 burley tobacco locations, if the chemical is to be entered in both flue-cured and air-cured tobacco classes. Both locations for any 1 class are to be in the area where the class is normally produced.
2. 15-plant plots (nonreplicated).
3. Efficacy based on sucker weight and number; the test chemical must be 90 percent as effective as the performance of the appropriate standards included in the same test. (See Test Standards.) Data are to be obtained for flue-cured tobacco 2 wks after treatment (observational) and at final harvest (sucker number and green weight). For burley tobacco, sucker number and green weight are to be taken at harvest.
4. Phytotoxicity data taken at the appropriate stage (scale 0 to 5); leaf drop is to be noted.
5. Records of cultural practices and environmental conditions.

Regional Preliminary Tests. These tests are conducted by State or Federal agricultural experiment station scientists who are Committee members. General testing requirements are:

1. The formulation of the chemical (or closely related formulation) must have been tested on field-grown tobacco.
2. Each person conducting the test must know the chemical composition of the active ingredient on a confidential basis.
3. The company is to supply all information available on toxicity to humans, animals, etc. and any information available on the breakdown, persistence, action, etc. of the chemical.
4. The company is to supply sufficient quantities of the formulated chemical to conduct the tests at all proposed locations. The formulated chemical is to be packaged in containers which can be shipped to the individual locations by the specific dates stipulated by the Committee.
5. The company submitting the chemical is to suggest a rate and is to specify whether the chemical will be used alone or as part of a sequential treatment. The company also is to indicate if it is to be considered a new or modified chemical.
6. After application of the formulation, and during the test, the research worker will determine, by visual observation, the potential of the chemical for achieving the desired results. This information will be forwarded immediately to the coordinator for that tobacco class so that information on efficacy across a particular class can be summarized. After a decision is made by the

coordinator, based on the information available, complete data will be collected from only those treatments showing the desired results.

Field test procedures and data requirements for regional preliminary tests include the following:

1. Suggested distribution for flue-cured tobacco, 6 locations; for burley tobacco, 4 locations; for cigar filler tobacco, 2 locations; for dark tobacco, 2 locations; and for Maryland tobacco, 1 location.

2. 30-plant plots (nonreplicated).

3. Agronomic observations.

a. Efficacy based on percent sucker control by weight.

b. Phytotoxicity data taken after 2 days and at a maximum manifestation (0 to 5 scale). Leaf drop is to be noted.

c. Yield.

4. Cured leaf data (on successful entries only).

a. Quality evaluations based on percent usable by tobacco companies.

b. Chemical and physical properties (composite sample by class). (See Table 1.)

c. Smoke-taste tests to include major off-flavor screening only. (Tobacco companies conducting smoke panel tests must know identity of applied chemicals.)

d. Residue determinations reported to the Committee for information purposes only.

Requirements for passing the regional preliminary test are listed below. (See also Test Standards.)

1. Minimum sucker control based on sucker weight must be 90 percent as effective as the performance of the appropriate standards included in the same test.

2. Leaf injury must average 2.5 (0 to 5 scale) or less with no leaf drop and must be compared to appropriate standards.

3. Warehouse evaluation, physical and chemical properties determinations and smoke tests results must compare favorably with appropriate standards.

Regional Advanced Tests. After successfully passing the preliminary tests, chemicals may be entered in advanced tests, also conducted by State and Federal scientists-Committee members. General requirements include:

1. The identity of the active ingredient of an entry must be revealed as public information. The identity of the complete formulation of an entry must be revealed to the overall test coordinator on a confidential basis.

2. The company is to supply all information available on toxicity to humans, animals, etc. and any information available on the breakdown, persistence, action, etc. of the chemical.

TABLE 1—REQUIRED CHEMICAL AND PHYSICAL PROPERTY ANALYSES

Flue-cured tobacco	*Burley tobacco*
Nicotine or total alkaloids.	Nicotine or total alkaloids.
Reducing sugars	Total N.
Total volatile bases	Alkalinity number of water-soluble ash.
Total volatile bases minus nicotine.	Equilibrium moisture content.
Total ash	Filling value.
Equilibrium moisture content.	Total volatile bases.
Filling value	Total volatile bases minus nicotine.
	Total ash.

3. The company is to supply sufficient quantities of the formulated chemical to conduct the tests at all locations proposed. The formulated chemical is to be packaged in containers which can be shipped by the company to the individual locations by the specific dates stipulated by the Committee.

4. Only 1 application dosage per chemical treatment (based on data obtained from the regional preliminary test) will be tested in a given regional advanced test for any 1 tobacco class.

Field test procedures and data requirements for regional advanced tests include the following:

1. Suggested distribution for flue-cured tobacco, 6 locations; for burley tobacco, 4 locations; for cigar filler tobacco, 2 locations; for dark tobacco, 2 locations; and for Maryland tobacco, 1 location.

2. Plot size—randomized block design with 4 replicates, 30 plants/replicate. (See Test Standards.)

3. Agronomic data.

a. Efficacy based on percent sucker control, sucker number, and sucker weights for full season.

b. Phytotoxicity data taken after 2 days and at maximum manifestation (0 to 5 scale).

c. Cured leaf yield.

4. Cured leaf data.

a. Warehouse evaluation based on usability and body and texture for flue-cured tobacco; usability and quality rating for burley tobacco.

b. Chemical and physical property determinations. (See Table 1.)

c. Smoke-taste tests (off-flavors). The company is to state if the taste is objectionable.

5. Residue determinations.

a. Sampling procedure. Cured leaf will be taken from 3 stalk positions: bottom third, middle third, and top third. Whole leaf samples will be submitted by location to the chemical company; midrib tissue will be included in the sample analyzed.

b. Sample size. A 25-leaf sample will be drawn at random for each of the stalk positions mentioned above. If large plots are involved, several samples will be taken and subdivided. Residues will be determined on flue-cure and burley tobacco and possibly also on the other tobacco classes involved in the regional tests.

c. Analytical methods. The chemical company will develop reliable analytical methods for residue determinations and submit the residue data to the Regional Committee, if permissible. Upon request, analytical methods will be made available by the company to individual members of the Regional Committee on a confidential basis.

d. Specialized residue analysis may be conducted on cigarettes manufactured from treated tobacco.

Requirements for passing the regional advanced test are listed below. (See also Test Standards.)

1. Minimum degree of sucker control must be 90 percent as effective as appropriate standards.

2. Leaf injury must average 2.5 (0 to 5 scale) or less with no leaf drop due to chemical.

3. For flue-cured tobacco, the specified chemical and physical properties should fall between those of the standard hand-suckered check and those of a contact substance applied at the early flower stage followed by a systemic chemical applied from 1 to 2 wk after the contact chemical (sequential). For burley tobacco, the specified chemical and physical properties should fall between those of the standard hand-suckered check and a maleic hydrazide treatment. If the data are statistically analyzed, the 0.05 level of significance will be used to determine if the specified chemical and physical properties fall between the standards.

4. In the warehouse evaluation, the cured leaf from treated plants must compare favorably with the standard hand-suckered and sequential treatments for the flue-cured tobacco and with the standard hand-suckered and the maleic hydrazide treatment for the burley tobacco.

5. Smoke-taste tests are designed to ascertain if the chemical treatment imparts an off-taste to the smoke of cigarettes manufactured from treated tobacco. They are to be conducted as comparison tests between a known check sample and a treated sample. A coded check sample will be used as an internal standard. In addition to the simple evaluation of "acceptable" or "not acceptable," the percentage of acceptable and non-acceptable and the number of panelists will also be reported by each tobacco company making smoke panel tests. Each company is to specify which treatment, if any, is considered objectionable.

Company Proprietary Tests. The chemical company sponsoring a chemical is responsible for conducting these final "on farm"-type tests. All data is to be submitted to the Regional Committee for evaluation. General requirements include:

1. Using the same formulation tested in the advanced and/or preliminary tests, the company is to conduct field tests at a minimum of 3 flue-cured and/or 2 burley tobacco locations.

2. Applications should be made with mechanical sprayers used in the commercial production of tobacco. More than 1 application rate also is desirable.

Field test procedures and data requirements for company proprietary tests include the following:

1. Distribution and test locations. For flue-cured tobacco, 1 southern (Fla., Ga., or S.C.); 1 eastern (N.C.); and 1 old belt (N.C., Va.). For burley tobacco, 1 high elevation (N.C., Va.) and 1 lower elevation (Tenn., Ky.).

2. Plot size. 1/10 acre as single or replicated small plots. Data taken on 3 10-plant subsamples. One 30-plant topped, not suckered, plot is to be included for calculation of percent suckered control.

3. Agronomic data.

a. Efficacy based on percent suckered control, sucker number and sucker weights.

b. Phytotoxicity at maximum manifestation (0 to 5 scale).

4. Residue determinations on cured leaf (to be reported to Committee for informational purposes only). (See regional advanced test.)

5. Modified chemicals and/or formulations going through company proprietary tests which have not been subjected to smoke tests will require such tests.

TEST STANDARDS

1. Sucker control treatments.

a. Contact: Off-shoot-T

b. Systemic: MH-30

c. Sequential: Off-shoot-T followed by MH-30

d. Untreated: hand-suckered (HS) (suckers are removed when they are 4 to 6 in. long); topped, not suckered (TNS).

2. Degree of sucker control measured as total number and percent by which treatment reduced sucker green weight compared with topped but not suckered check (90 percent of appropriate standards).

3. Leaf injury.

a. Scale, 0 to 5: 0=none; 1=very slight; 2=slight; 3=slight to moderate; 4=moderate; 5=severe.

b. No leaf drop compared to appropriate standards.

4. Warehouse evaluations by tobacco companies based on percent usable tobacco (average and total usable by at least 1 company).

a. Regional preliminary test requires percent usable only.

b. Regional advanced test requires percent usable and body and texture for flue-cured tobacco; percent usable and quality rating for burley tobacco.

5. Chemical and physical properties must fall between the properties of standard hand-suckered and sequentially treated flue-cured tobacco, and between the properties of standard hand-suckered and MH–30 treated burley tobacco.

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CONTROL OF POTATO TUBER SPROUTING

In recent years, several types of growth regulator applications have been used to successfully induce dormancy: (1) Applying the product as preharvest applications; (2) dipping tubers in a solution of the product before storage; (3) dusting the tubers with the product before storage; (4) applying the regulating chemical as a volatile suspendable solid to the tubers while in storage; or (5) applying the product as a spray or wax solution to the tubers as they are packaged for the retail market. Factors, such as storage temperature, affecting potato sprout inhibition and methods of testing have been discussed in several publications (Sparks and Summers, 1974; Zaehringer, et al., 1966; Rao and Wittwer, 1955; Hruschka et al., 1965; Nylund and Ayres, 1964; Cunningham et al., 1966; and Weaver, 1972).

Test Conditions. The usual procedure is to randomly collect about 400 tubers for each variable to be tested. They should be field-run quality but with no green, rot or serious malformations. These are divided into 4 replicates of 100 tubers each. The method of applying the inhibitor depends upon the time at which the material is to be applied. Several dosage levels of the chemical under test are necessary.

In the case of preharvest applications of growth regulators to potato plants, variables, such as time of application, dosage of chemical applied, time of harvest and effect of rainfall must be considered in addition to subsequent storage conditions. Replicated plots (usually 4 replicates) sufficiently large to allow statistical analysis should be used.

Treated tubers or tubers from treated plants should be stored at various temperatures, subjected to various airflows and treated with air of different humidity levels to determine length of control (Sparks, 1965 and Sparks, 1973). Retreatment with the inhibitor may be required if the material is volatile and high rates of airflow are used. For comparison purposes, untreated tubers and tubers treated with standard sprout inhibitors are to be included. Standard chemicals may include CIPC (isopropyl-m-chlorocarbanilate), TCNB (1,2,4,5-tetrachloro-3-nitrobenzene), maleic hydrazide or other chemicals registered for this use.

Interpretation of Test Results. At monthly intervals, for 12 mo, data on weight loss, rot and sprouting should be taken. At the end of the storage period other data are also usually obtained:

1. Weight loss.
2. Rot loss.
3. Sprouting.
4. Flattening and shriveling.
5. Effect on suberin and wound priderm formation.
6. Heat generated in the potato pile (a gross measure of respiration rate).
7. Quality change (sugars, mealiness, fry color, flavor, chipping).
8. Appearance change (loss of net or russetting).
9. Utilization as propagation stock.

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CONTROL OF BRANCH ANGLE IN YOUNG TREES

In many trees, especially apples and pears, the primary branches form narrow angles with the main trunk which result in structurally weak crotches that often break under moderate or heavy fruiting and seriously reduce the productiveness of the tree. Also, such narrow crotches are very prone to winter injury. Within a few years the entire tree may be lost from further weakening and from secondary infection. The development of wide branch angles avoids the bark inclusion in the tree crotches and the trees can bear heavier crops when they begin fruiting. The more open growth also permits more light into the center of the tree, which is particularly useful on spur type Delicious apples or regular Delicious on dwarfing stock. Factors affecting chemical treatments to modify crotch angle and methods of testing to demonstrate the efficacy of a chemical treatment have been discussed in several publications. (Verner, 1938; Bukovac, 1963, 1968).

Test Conditions. Young fruit trees, usually in the second or third year after being set in the field, are sprayed with several concentrations of the test chemical. The correct timing of application must be determined (usually when the new shoot growth is 3 to 5 in. long). The angle at which the branch leaves the main stem should be measured at the end of the growing season. The effect on vegetative growth also should be measured. Some of the factors affecting product performance are listed below.

1. Volume of spray may be important. The trees should be sprayed to runoff until sufficient data show that lower volumes can be used.

2. Since response to chemical treatment can vary widely with variety the effect on all varieties should be studied.

3. Tests should be made for each variety to determine the rate (lb. active ingredient/100 gal of spray solution and *volume* of spray solution applied per tree) and the stage of development of the tree at the time of application that will give the best response under the environmental conditions where the product will be used.

4. The effect of seedling vigor and rate of growth should be determined, especially in relation to inhibition of vegetative growth.

5. The effect of rainfall following application should be determined.

6. The effect of a repeat application the following year should be determined.

Interpretation of Test Results. To support label claims for modifying crotch angle development in fruit trees, the treatment should increase the angle at which the branch leaves the main stem. This is more important than just causing the outer part of the branch to bend downward. In general, the angle should be greater than 45 degrees to insure wide angle laterals for a sounder structural framework in trees.

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CONTROL OF ALTERNATE BEARING IN APPLES

Many varieties of apples bear heavily 1 year ("on" year) and very little the following year ("off" year). Chemical treatment (return bloom treatment) applied in the "on" year before blossom differentiation can increase yield during the "off" year. In addition to leveling out crop production for the 2-yr cycle, such treatments often result in an increase in total yield for the period.

Test Conditions. A series of test trees, in the "on" year, should be paired on the basis of uniformity of rootstock, tree size and the intensity of blossoming in the spring of the year. One tree of each pair is sprayed with the chemical treatment; the other should remain untreated. Each treatment should be sprayed to runoff until data are accumulated to show that lower volumes are equally effective. Various rates need to be tested on each variety to determine the optimum rate. Timing of application must also be determined. (The optimum timing usually is 4 to 5 wk after full bloom.) To maintain uniform crop production, it is necessary to treat only during the "on" year. Because the degree of blossoming in the spring will determine those years in which treatments should be made, studies are needed on each variety on the degree of spring blossoming and the amount of return bloom the following season.

Since climatic conditions can affect performance, it is absolutely necessary to test the compound in each location where it will be used. Growers should be cautioned to start with a small block of trees until they gain experience in the performance of the compound under their environmental conditions. Any affect of rainfall following application should be determined.

The effect of a blossom thinning treatment or the occurrence of frost on blossom set should be determined before the application of the return bloom treatment. Studies with various degrees of blossom thinning are needed to determine the rate and effect of the return bloom treatment.

Tree vigor and size, as well as the mineral nutrition of the tree, also can affect response.

Interpretation of Test Results. The effect of any treatment on the control of biennial bearing will be noted in the year following treatment. The yield should be taken at the end of the second season and compared with untreated trees. However, since the objective is to even out the productivity of the tree, yields should also be taken at the end of the first season and the total yield for the 2 yr should be compared.

Normally, yield alone will not give the total picture and it is necessary to grade the fruit and determine the market price for each grade. This may show a greater cash return to the grower than if total yield alone were the only criterion used. Return bloom treatments may also inhibit vegetative growth, and an additional benefit may be a reduction in the amount of pruning necessary. There is also a possibility of delayed bud growth in the spring which can be helpful to the grower in areas of late spring frosts.

Some other effects which should be reported may include: (1) The treatment can hasten or retard the maturity of the crop in the treatment year; and (2) the treatment may increase the severity of a physiological disease known as "bitter pit."

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CONTROL OF SEX EXPRESSION IN CUCUMBERS AND SQUASHES

The biochemical control of sex expression in cucumbers and squashes aids in the production of hybrid seed and also can be useful in increasing yield, especially where once-over destruct harvest is practiced. A chemical treatment is made at the early seedling stage of growth to increase the number of pistillate (female) flowers and to decrease the number of staminate (male) flowers. These treatments bring about formation of female flowers at lower nodes where normally only male flowers are formed in the standard (monoecious) cucumber and squash varieties. Factors affecting this sex response and methods of testing to demonstrate the efficacy of a chemical treatment have been discussed in a number of publications (McMurray and Miller, 1968 and 1969; Robinson, et al., 1969; Rudich et al., 1969; Sims and Gledhill, 1969; Weaver, 1972).

Test Conditions. For sex ratio studies, field trials consisting of single-row plots 8 ft long with 10 plants per plot are adequate. Each treatment and control plot should be replicated 4 times. For yield trials, however, single-row plots 40 ft long with 120 plants per plot should be used, with 6 replications per treatment. The test plots should be located in the middle of a field containing sufficient untreated monoecious plants to assure an adequate supply of pollen. Application should be made to seedling plants to assure good coverage (100 gal/acre).

To evaluate the effectiveness of a treatment on sex expression, the sex of each flower at each node should be determined on a weekly basis during the blooming period. To determine the effect on yield, the plots should be harvested twice a week, starting when the first fruit is at the proper stage. For mechanical harvesting, each plot should be harvested separately at the correct stage to take into account any delay or hastening of maturity. In all cases, the yield should be separated by grade and the market price for each grade at each harvest date should be determined.

Some of the test conditions and variables that should be studied are listed below.

1. For hybrid seed production the amount of seed per fruit should be determined. Also, the percentage germination and the storage life should be studied.

2. The response between varieties can differ significantly, and the correct timing, rate and number of applications should be studied on each variety under different environmental conditions.

3. The effect on delay or hastening of maturity should be determined.

4. Effects on fruit quality and fruit shape should be made.

5. Since the effect on sexual modification towards femaleness in the treated plants may be temporary, studies should be made to determine the length of effectiveness of each treatment.

6. The effect of rainfall following application should be determined.

7. The effect of the treatment on vine growth should be noted.

8. Any effect on time of flowering should be noted so that the pollination line can be planted at the proper time to supply adequate pollen.

Interpretation of Test Results. To support claims as an aid to hybrid seed production, the data should show an increase in the percentage of female blossoms at the early stages of flowering. Seed production in the treated fruit should not be decreased, and the hybrid seed should have good germination and storage life.

To support claims for increased yield, data are needed for yield and grade for the period during which the crop is harvested and marketed. Total yield during the growing season is often very misleading, especially if a large percentage of the fruit falls in the low-priced grades. In once-over destruct harvests, comparisons are needed between yield from treated and untreated control plots harvested at the same stage of development. If the chemical treatment hastens or delays the development of the fruit, it is necessary to harvest the treated and untreated control plots at the same stage of development but maybe at different times. The chemical treatment should not cause any adverse effect on fruit shape or quality.

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CONTROL OF FRUIT MATURATION AND RIPENING

Growth regulators are being tested experimentally and used commercially to achieve a number of specific objectives related to fruit maturation and ripening. Included in these objectives are (1) enhancing pigmentation in cherries, cranberries and apples (Chaplain and Kenworthy, 1970; Eck, 1969; Edgerton and Blanpied, 1968); (2) hastening or delaying maturity in peaches, tomatoes and apples (Looney, 1972; Robinson et al., 1968; Unrath, 1971); (3) the concentration of ripening in tomatoes, blueberries and apples (Iwahari and Lyons, 1970; Eck, 1970; Schomer et al., 1971); (4) improving uniformity of ripening and enhancing fruit quality in bananas (Russo et al., 1968); and (5) enhancing abscission and loosening to facilitate mechanical harvesting (Bukovac et al., 1969, 1971).

Test Conditions. Test conditions that should be reported are plot sizes, number of plants per plot, number of replications and controls. Information on product application should include number of treatments; rates of application; time of application; methods of application; a comparison of dilute versus concentrated applications and low versus high gallonage applications; and possible interaction with other chemicals applied. Differential varietal responses are important and should be adequately investigated.

Possible parameters in measuring growth regulator effects on the maturation and ripening process include such quality measurements as sugars, acids, pigments, viscosity, firmness, dry weight, flavor, appearance, short and long term storage quality and size. Yield, also an important parameter, might include measurement of total yield, marketable yield, grades, percent of crop mature at a single harvest and yield distribution over the entire harvest period. Residual effects should also be evaluated, particularly as they may influence subsequent flowering and fruit set on perennial plants and seeds of annuals.

Some other conditions that should be studied are listed below.

1. Plant condition should be monitored, noting particularly any possible stress conditions.

2. Environmental conditions, particularly temperature, soil moisture, and possible weather conditions before, during and after treatment, should be monitored.

3. Soil residual effects on greenhouse and container grown crops should be measured.

4. Changes in insect and disease susceptibility should be noted.

5. Any chemical residue on the harvested fruit should be measured.

Interpretation of Test Results. Suggested interpretations in terms of the quantitative level of response obtained from growth regulator treatment might include: (1) A 15 percent improvement in yield, when yield is the primary objective; (2) advance or delay of harvest by a week for a growth regulator treatment designed to modify the harvest season of a particular crop; (3) a pigment enhancement of 50 percent, particularly in early harvested fruit; and (4) concentration of yield which results in 80 percent of the total harvest occurring in a single picking for a growth regulator designed to concentrate the harvest.

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CONTROL OF FRUIT ABSCISSION

Soon after mechanical harvesting of fruits was tried, it became obvious that, in many cases, treatment of the trees or vines with abscission agents (chemical looseners) would be beneficial and that, with some types of mechanical harvesting equipment such as air harvesters, it is required (Wilson and Coppock, 1968; 1969). Citrus, cherries, olives, apples, grapes and pecans are examples of crops whose harvest can be aided by the use of such compounds (Weaver, 1972). Specific requirements for each crop may vary somewhat, but the overall principles involved appear to be similar. Although the following test conditions relate primarily to citrus fruits, some examples of problems encountered with other crops are also included.

TEST CONDITIONS

Method of Application. The application method usually will be by dilute or concentrated spray. Most of the current abscission chemicals under investigation appear to function through contact rather than systemic action; a uniform spray coverage of trees and vines, therefore, is necessary. Other methods of application should be evaluated as to their practicality under field conditions (Wilson, 1966; 1967).

Timing and Environmental Conditions. Most abscission agents produce fruit loosening within 3 to 7 days following spray application although this may vary depending on the crop involved. With citrus, the abscission agent can normally be applied at any time during the period when the fruit is considered legally mature (Wilson, 1969)

Weather conditions may affect abscission chemicals (Wilson, 1969; 1972) and should be studied. Although no loss of activity due to high temperatures has been reported, abnormally wet and cold conditions may adversely affect results either by washing off the material before it has time to act or delaying or reducing its effects by slowing metabolic processes.

Consistency of Performances. Failures caused by adverse environmental conditions can occasionally be expected; unexplained failure occurring under good environmental conditions, however, should be rare. Thus, inconsistency in chemical performances should usually be interpreted unfavorably. The effects of various rootstocks should also be considered in evaluating results, for, with citrus fruits, certain rootstocks produce fruit which loosen more readily when abscission chemicals are applied (Cooper and Wilson, 1971).

Physical Measurements of Chemical Effectiveness:—The most common method used to determine degree of citrus fruit loosening is through use of a pull force measuring device (Hendershott, 1964). Most of these devices measure straight pull breaking force necessary to separate the stems from the fruit. These pull forces may vary from a few grams (olives) to 30 to 40 lb (some citrus fruits). A measure of effectiveness is a substantial reduction in the average pull force measurements from that of a control.

Interpretation of Results. In evaluating abscission results, 2 principal factors must be considered, depending on which of the methods of removal discussed below is employed and the ultimate use of the fruit (processing or fresh).

If fruit is to be shaken to the ground for mechanical or hand pickup, maximum fruit loosening is desired. Under these conditions, there is a high probability that substantial fruit drops will occur before harvest (Wilson, 1973). With citrus fruits, pull force will be reduced from 14 to 18 lb for untreated fruit to an average of 2.5 lb for treated fruit. Fruit drops of 20 to 50 percent could be expected when fruit is this loose. Under some experimental conditions and sometimes under field conditions, fruit loosening will be so complete that the fruit will separate from the stem when touched and prevent the measurement of pull force. These results can be classed as "too loose to pull," "all fruit dropped" or some other appropriately descriptive phrase.

If fruit is to be shaken by a mechanical device onto a catchframe, fruit loosening should not be as complete as above. A chemical developed for use with catchframes should loosen citrus fruit ideally to no less than 6 lb average pull force.

Abscission agents are of 2 types: (1) Chemicals which release ethylene or cause ethylene production by the fruit without peel injury; and (2) chemicals which may cause superficial rind injury with resulting wound ethylene formation. Although abscission not related to the action of ethylene may be possible, all present commercial abscission agents appear to utilize the ethylene mechanism. Many fruits, including citrus fruit intended for fresh fruit utilization, apples, cherries, and perhaps olives and pecans (nuts) respond to chemicals with this mode of action.

Citrus fruits loosen readily when chemicals cause superficial peel injury. Chemical damage to the rind is acceptable on citrus fruit for processing if it does not cause fruit splitting and excess rotting under wet conditions (Wilson, 1972) or adversely affect juice flavor.

The amount of phytotoxicity which can be tolerated by trees and vines before yields and/or fruit quality are adversely affected varies with the crop and time of year. No specific percentages of leaf drop have been determined for citrus fruits which indicate the upper limits of phytotoxicity; experience has shown that a fairly large margin of safety is necessary. With a crop, such as apples, excessive leaf drop accompanying abscission sprays applied in the fall occurs then anyway. With some other crops, economic considerations may be such that some phytotoxicity can be tolerated.

Because mature fruits, leaves, immature fruits and flowers are all subject to abscission through basically the same physiological process, the growth regulator(s) selected for abscission should be specific to removal of only mature fruits or nuts. The Valencia orange, for example, poses a distinct harvesting problem because its lengthy development period (11 to 18 mo) results in the presence of flowers or immature (green) fruits during most of the harvest season. It is important, therefore, that any abscission chemical selectively loosen mature fruit but cause minimum phytotoxicity to flowers, immature fruits or young growth which might be present.

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INCREASED BERRY SIZE OF SEEDLESS VARIETIES OF TABLE GRAPES

When vines of Thompson or other seedless grapes are girdled at the fruit-set stage, a large increase in berry size—sometimes as much as 100 percent—usually results. Since about 1960, almost all Thompson Seedless grapes intended for table use have been sprayed with 1 or 2 applications of gibberellin. These treatments, along with girdling, increase berry size in a uniform manner (Weaver, 1972).

Test Conditions. The test chemicals are usually applied after shatter (separation of calyptra from flower) following bloom (also the normal girdling time). Four vines per replicate should be sprayed to wet cluster area thoroughly. Use 5 concentrations of the test product and compare results with untreated controls and with gibberellin at label rates.

Test Results. At harvest the following measurements should be made:

1. Crop weight per vine.
2. Average weight of 100 berries per vine to indicate berry size. (Take berries from various clusters and from base, middle and apex of cluster.)
3. Brix value of juice taken with a refractometer.

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LOOSEN COMPACT CLUSTERED VARIETIES OF VITIS VINIFERA (WINE GRAPES)

The incidence of rot in seeded wine grapes is excessive in varieties that produce compact clusters, for example, Zinfandel and Carignane. Berries are pushed off by other expanding berries, and the juice from the fallen fruit fosters decay organisms. Tight clusters are also slow to dry after rains. Loosening of the cluster is a result of reduced set, cluster elongation, and/or production of shot berries (Weaver, 1972); prebloom sprays of gibberellin also loosen these clusters (Weaver and McCune, 1959).

Test Conditions. Test chemicals are usually sprayed onto the vines 2 to 3 wk before bloom when the shoots are 15 to 20 in. long; clusters should be 3 to 4 in. in length, but may range from 2 to 5 in. in length. Use 4 replicates of 4 vines per treatment. Use 5 concentrations of the test product and compare results with untreated controls and gibberellin at label rates for the variety. The clusters must be thoroughly wet.

Test Results. At harvest the following measurements should be made:

1. Estimate of looseness percentage. The compact control clusters are considered to have 0 percent unoccupied space. Estimate that part of the total volume of a cluster not occupied by berries.
2. Number of berries per cluster (for the determination of effect on berry set).
3. Length of cluster from basal lateral to the apex of the cluster.
4. Berry size (average weight of 100 berries).
5. Degrees Brix value of juice taken with a refractometer.
6. Percentage of rot which has occurred in each treatment.

References

Weaver, R. J. 1972. Plant Growth Substances in Agriculture. W. H. Freeman & Company, San Francisco. (pp. 348–349).

Weaver, R. J., and S. B. McCune. 1959. Response of certain varieties of *Vitis vinifera* to gibberellin. *Hilgardia* 28:297–350.

ACIDITY REDUCTION IN CITRUS

The 2 main purposes for acidity reduction in citrus fruits are to produce early maturity of fruit and thereby lengthen the marketing season and to produce sweeter fruit. In analytical chemical terms, "sweet" means "high ratio fruit" as measured by the standard accepted Brix/acid determination. Maturity of citrus fruits generally follows the pattern of gradual reduction of acid during the fruit season, and usually there is a corresponding increase in soluble solids (sugars).

Test Conditions. Field trials to reduce acidity may consist of single-tree plots replicated 6 times. Materials are applied as sprays to thoroughly cover fruit and foliage. With citrus fruits which maintain a generally recognized low respiration rate, the time of application of the sprays is usually 4 to 10 mo before harvest. (The development of sprays which would shorten this interval would be desirable.) At the present time maturity sprays are applied from postbloom until the end of the summer spray period, although the most effective time is 1 to 6 wk following bloom—late March to early May.

Twenty fruit per tree, a total of 120 fruit per treatment picked at random (inside and outside of the canopy), are taken from the treated, control and standard product at biweekly intervals 30 days before and during the normal harvest period. The following measurements should be taken:

1. Determine the percent juice for each sample (total weight of squeezed juice per unit weight of fruit).
2. Determine the percent acid (total titratable acid) using phenolphthalein as the indicator and 0.3125 *N* NaOH as the basic solution.
3. Determine Brix value for each sample.
4. Calculate ratio of Brix value to acid.

Interpretation of Test Results. At least 2 limitations to use of an acidity reducing compound should be considered:

1. Oranges, tangerines, grapefruit, tangelos and tangelo hybrids can be subject to excessive acidity reduction and produce a sweet fruit with an undesirable "inspid" flavor.
2. "Flavor" of a fruit or fruit juice is made up of several components. Although a growth regulator may reduce juice acidity of immature fruit to what would be considered acceptable for mature fruit, it would not affect the raw, immature flavors also present in the immature fruit. Normally these immature flavors diminish at a Brix of 9.0 or higher.

APPLE SCALD INHIBITORS

Substantial information about scald is available, as it has been widely studied for over 60 yr (Huelin, 1964; Smock, 1961; Smock and Southwick, 1945). The cause is still unknown or indefinite. Because it is usually much worse on early pickings, it is associated with immaturity. Scald susceptibility varies from season to season so weather before harvest also is a factor. Many researchers believed that volatile materials caused scald, since relatively high levels of esters induce an artificial scald-like injury on apples, but the volatile theory is no longer widely accepted. Recently, Australian researchers (Pierson et al., 1971) have suggested that oxidation products of α-farnesene are the direct cause of superficial scald. They further suggest that effects of artificial antioxidants on the oxidation of α-farnesene could first be measured in comparatively short tests before testing for control of scale on apples.

For many years use of tissue wraps containing mineral oil around each fruit was the standard scald-control procedure. Growth regulating substances, such as naphthalene acetic acid (NAA), applied as a postharvest dip provided considerable control but were not used commercially (Schomer and Marth, 1945). Commercial scald control is now obtained by using 1 of 2 anti-oxidants (Smock, 1961); diphenylamine or 1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline (ethoxyquin). Both chemicals are registered for use on apples and provide good scald control (Dewey and Dilley, 1964; Hardenburg and Anderson, 1962; Huelin, 1964; Mattus and Rollins, 1963).

TEST CONDITIONS

1. Use freshly harvested apples, 50 to 100 per replicate. More scald will develop in control lots if fruit is picked 1 wk before the best commercial date. McIntosh, Rome Beauty and Red Delicious are scald-susceptible varieties.
2. Apply test product and appropriate standard products within the first 7 to 10 days after harvest. Dip or submerge apples for 10 sec in test solutions or suspensions. Keep test suspensions well-agitated.
3. Fruit temperature and treatment solution temperature should be moderate (60° to 70° F). Cold fruit will not take on a good coating of test chemicals.
4. After treating fruit, tilt boxes or turn fruit to improve drainage and prevent possible chemical burn in stem or calyx cavities. Examine for initial visible residue.
5. To predict scald intensity, store treated and untreated fruit samples in boxes with unsealed 1.5-mil polyethylene liners for 4 to 6 wk at 70°F (Smock, 1961).
6. To determine commercial scald control, store treated and untreated fruit samples in unlined boxes for 5 to 6 mo at 32°F (38°F for McIntosh) with high relative humidity (90–95 percent), then transfer to 70°F for 7 days to allow scald symptom development (Hardenburg and Anderson, 1962; Huelin, 1964; Mattus and Rollins, 1963; Smock, 1961).

INTERPRETATION OF RESULTS

1. Determine the number of fruit with no scald, slight scald and severe scald. Slight scald is that affecting 10 percent or less of the skin surface and is light brown in intensity. Severe scald is that affecting more than 10 percent of the surface or is dark brown and markedly disfiguring.
2. Determine flesh firmness of fruit from treated and control fruit samples using a fruit pressure tester to determine any adverse effect on ripening or softening rate.
3. Examine fruit for "off odor," "off flavor," visivle residue, lenticel injury or chemical burn symptoms.

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PART IV.—PRODUCT PERFORMANCE

SUBPART E.—INVERTEBRATE CONTROL AGENTS

The methods presently referenced in this subpart include only bioassay methods developed by the Chemical Specialties Manufacturers Association (CSMA). They are acceptable for deriving data for product registration in laboratory or greenhouse testing. No field-testing methods or protocols are included at this time.

FOLIAR TREATMENT

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Ornamental Foliage Plants (private and commercial dwellings). CSMA. 1971. Determination of plant safety of pressurized formulations for use on plants in the house or garden. *Soap Chem. Spec. Blue Book* 47(4A): 173–174.

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LIVESTOCK, POULTRY, FUR AND WOOL-BEARING ANIMALS

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Fur and Wool-bearing Animals as Produce. CSMA. 1971. Evaluation of field performance of oil-based livestock sprays. *Soap Chem. Spec. Blue Book.* 47(4A):172, 190.

Meat Animals for Slaughter. CSMA. 1971. Evaluation of field performance of oil-based livestock sprays. *Soap Chem. Spec. Blue Book.* 47(4A):172, 190.

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PREMISE TREATMENTS

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Commercial, Industrial and Institutional Maintenance. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A):161–163, 191.

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Eating Establishments. CSMA. 1971. Cockroach spray method. *Soap Chem. Spec. Blue Book.* 47(4A):166–167. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A):161–163, 191.

Animal Feedlots and Holding Pens. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A):161–163, 191.

Farm Poultry Houses and Yards. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A):161–163, 191.

Farm Dairy Structures. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A): 161–163, 191.

Animal Buildings (other than dairy or poultry). CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A): 161–163, 191.

Farm Storage Structures and Equipment. CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A): 161–163, 191.

Greenhouses and Mushroom Houses (empty). CSMA. 1971. Aerosol and pressurized space spray insecticide test method for flying insects. *Soap Chem. Spec. Blue Book.* 47(4A): 161–163, 191.

STORED PRODUCTS

Stored Raw Agricultural Food and Feed (except grain). CSMA. 1971. Cockroach spray method. *Soap Chem. Spec. Blue Book.* 47(4A): 166–167.

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FABRICS

Laundry and Dry Cleaning. CSMA. 1971. Textile resistance test. *Soap Chem. Spec. Blue Book.* 47(4A): 168–171.

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PART IV—CONTENTS

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PART IV.—PRODUCT PERFORMANCE

SUBPART F.—VERTEBRATE CONTROL AGENTS

This subpart represents an appraisal of current methodology for evaluating the efficacy of vertebrate control agents. The classes of agents scrutinized are toxicants, repellents (including aversive conditioners), reproductive inhibitors, anesthetizing chemicals and devices. The *mode of action* of the control agents could not be examined on an agent-by-agent basis, especially in respect to the chemical senses. The vertebrate species include amphibians, reptiles, birds and mammals. The text is arranged in phylogenetic order, with any necessary introductory explanation about the methods preceding each target species. (For fish, see Part IV.B., Aquatic Pest Control Agents, and Part VII.B., Aquatic Toxicology.)

The appraisal primarily evaluates, or references, methods that have been tested and published in journals and technical bulletins; some information was derived from unpublished reports and manuscripts. The fact that only limited research has been conducted to test many vertebrate control agents accounts for the paucity of citations in some areas. Also, control agents for some species, such as bears, have not been extensively studied because the damage caused by the animal to human property or interests is limited.

Most target groups lack well documented, sound experimental protocols at this time. A great deal more research is needed in some areas before complete, acceptable testing protocols can be defined.

AMPHIBIAN TOXICANTS AND REPELLENTS

Many repellents and toxicants for amphibians could be tested following the methods used for fish, since in most cases problems caused by them are associated with fish production. Tadpoles, for example, are no problem where there are bass present in ponds, but in hatchery situations they may multiply rapidly and interfere with the growth of desirable fish (Helms, 1967). There are some notable exceptions; i.e., native toads have been reported to eat bees in apiaries in large numbers in California (Eckert, 1934).

Laboratory Studies. It is necessary to know the complete life history of the particular amphibian which one wishes to control, since the laboratory studies would vary according to the phase of the life cycle the toxicant or repellent is to control. Testing to determine LC-50 values at 24, 48 and 72 hr (Helms, 1967) was done in 15-gal. aquaria. Three to 5 test animals were placed in each aquarium and then the test chemical was added. A sixth aquarium was maintained as a control. Bullfrog and leopard frog tadpoles and a few species of toad tadpoles were tested. Seven species of fish were also tested under identical conditions.

Field Studies. After testing in aquaria, Helms conducted field studies. The methodology varied depending on the life history of the organism. In the case of tadpoles, 9 treatments were carried out in 6 different ponds. Following treatment, the tadpole numbers were checked by seining to determine the completeness of kill and whether nontarget species were affected.

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REPTILE TOXICANTS AND REPELLANTS

The reptiles include the skinks, horned toads, alligators, turtles and snakes. The lizards seldom need control, and turtles can be controlled by trapping, fishing or shooting (Dillard, 1973). Alligators are protected by Federal law.

Many snakes are beneficial or neutral because they consume rodents and insects. With about 400 deaths per year from snakebite in North America, and worldwide, about 50,000 deaths per year (Swaroop and Grab, 1954), however, some reptiles may require control.

Toxicants. No test methods for reptile toxicants were identified for review.

Repellents. Some of the literature points out that repellents may be acceptable control measures. Cowles and Phelan (1958) have shown that snakes are very sensitive to odors. Crawford and Gross (1969) have shown that snakes show heart and respiration rate responses to chemical stimuli.

Porter and Czaplicki (1974) have shown that both water snakes and garter snakes are sensitive to chemical cues produced by themselves or other species. The authors conducted a series of experiments to test the attractiveness or the repellency of snakes to others of the same species or other species.

The first set of experiments was carried out with small snakes (less than 17.7 in.). Ten glass aquaria with slate bottoms and porous lids were used. These were divided in half by tightly fitting partitions. The stimulus snake was confined to one side for 47.5 hr. All snakes defecated in their halves during the exposure period. At the end of the confinement the snake and partition was removed. A strip of tape was used to mark the bottom where the partition had rested. One test snake was then laid on the tape and the side (soiled versus clean) to which it moved was recorded. The snake's position was noted every 30 min throughout an 8-hr testing period. When using wild-caught garter snakes, the authors employed larger testing chambers. These were divided in the same manner and procedures were the same.

Jenkins' (1962) method for screening was to place 3 pairs of boxes, each box with one open end, in pens. The tops of the boxes were removable and the floors were covered with soil. The boxes, similar to squirrel live traps, were placed at right angles to the axis of the pen. Two openings faced in the same direction for each pair. This direction was opposite to that of the adjacent pair. Every other box was used as a control. All snakes were marked, for ease of identification, and placed in the ends of the pen farthest from the boxes and observed.

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AVIAN TOXICANTS, REPELLENTS, REPRODUCTIVE INHIBITORS AND ANESTHETIZING CHEMICALS

No specific laboratory or field test protocols exist for the efficacy evaluation of avian toxicants, repellents, reproductive inhibitors and anesthetizing chemicals. Recent publications by Lee (1970), Ochs (1972) and Schafer and Guarino (1970) provide brief descriptions of, and the rationale behind, some tests. Since many of the laboratory tests necessary to establish efficacy are described in detail in Part VII of this Appendix (Hazard Evaluation, human and domestic animal toxicity data and fish and wildlife toxicity data), this discussion will elaborate on laboratory tests only when it is necessary to provide additional information relative to avian control. The primary emphasis will be directed toward efficacy determinations in the field.

Discussions relative to laboratory studies for toxicants, repellents, reproductive inhibitors and anesthetizing chemicals have been combined under one heading (Laboratory Methods) since a majority of the laboratory tests must be conducted on all chemicals, irrespective of the proposed use. References to special studies or special emphasis relating to individual proposed uses are made in the text.

Discussions relative to field studies are broken down by the 4 major groups, since evaluation procedures in the field vary considerably. Field test protocols for bird control agents are still in the developmental stages. Since many of the referenced tests were conducted before the most recent legislative action on FIFRA, as amended, most of them are lacking in one or more of the studies now required. A number of areas can and should be strengthened with regard to all tests:

1. Better knowledge of cultural practices and bird populations in test areas.
2. Use of larger experimental units.
3. Strict adherence to treatment schedules.
4. Use of controls during the same test period.
5. Use of more replications per test.
6. Proper application of statistical techniques.
7. More adequate appraisal of hazards to nontarget species.

It must also be recognized that the field evaluation of efficacy of any bird control agent depends on conducting the test in the proper area at the proper time. Birds and biologists are not always able to mesh their activities in well controlled or ideal test situations; therefore, any proposed protocol must be adaptable to existing test situations.

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AVIAN TOXICANTS, REPELLENTS, REPRODUCTIVE INHIBITORS AND ANESTHETIZING CHEMICALS: LABORATORY METHODS

Acute Toxicity. The various methods for determining acute oral and dermal toxicity in birds are described in Part VII of this Appendix; however, since control agents are seldom developed for use on the test species recommended in Part VII (i.e., ducks and quail), it will be necessary to conduct LD–50 evaluations on the target species *and* on selected nontarget species which may be affected by the proposed control agent. Since availability of wild birds for tests (particularly protected and/or nontarget species) may be severely restricted, it may be necessary to conduct LD–50 determinations with what would normally be considered less-than-sufficient numbers. The moving point interpolation method described by Thompson (1947), Thompson and Weil (1952), and Weil (1952) is particularly appropriate for this purpose. Descriptions of the use of this method for wild birds are provided by DeCino et al. (1966), Schafer (1972), schafer et al. (1973), and Tucker and Crabtree (1970).

Subacute Toxicity. The exact technique used to determine subacute toxicity will depend on the proposed application of the control agent. Tests should be conducted on target and selectd nontarget species. For proposed applications resulting in short-term exposure, the 5-day dietary LC–50 test protocol developed by Heath and Stickel (1965) as modified by Hill (1972) may suffice. Since many applications of control agents (i.e., repellents) may result in longer exposure, longer term tests should be conducted to approximate the maximum period of exposure. The 7- to 40-day test procedures described by Schafer and Marking (1974), Schafer et al. (1974b), and Tucker and Crabtree (1970) may suffice for most applications. It may, however, be necessary to conduct studies for as long as 90 days; in this case the methodology described by Hayes (1967) may be acceptable. Again, the size of test populations will necessarily vary with the availability of the test species.

Inhalation Toxicity. Data on inhalation toxicity will be necessary on the target species and on representative nontarget species if the proposed use of the control agent results in respirable gas, fumes, aerosols or dusts. Because there are no published records of laboratory tests using wild avian species, modified mammalian tests can be used.

Secondary Hazards. Since the use of avian control agents in urban and suburban areas presents a potential hazard to carnivorous avian and mammalian predators, indicative data related to the proposed use should be gathered to define the degree of hazard to canines or felines, at least 1 species of hawk and 1 species of scavenger bird. Schafer et al. (1974a) describes some test methods. Because of the nature of the tests and availability of suitable test animals, small test populations will be acceptable unless hazards are encountered. If hazards are found, more extensive testing may be required.

Repellents. The repellency (or acceptance) of a compound can be determined by a number of different techniques. The initial evaluation may utilize the individual response—no choice method described by Star et al. (1964) and modified by Schafer and Brunton (1971). Although this method usually overestimates the amount of chemical needed to produce a repellent response under field conditions, it does provide data on the maximum treatment levels needed to produce protection. To determine comparative repellency (or acceptance) of a chemical in individual birds and groups on preference, the methodology described by Hill (1972), Luckwill and Weaver (1965), McLean (1972) or Ridsdale and Granett (1969) may be acceptable. Although indications of the repellency (or acceptance) of chemicals can also be obtained when the chemical is incorporated into drinking water (Duncan 1963), tests on foods are preferred unless water is the item to be protected.

Reproductive Inhibitors. Few laboratory methods have been published on wild avian reproduction. Since most wild birds are difficult to breed in captivity, domesticated species have generally been used. The application of a potential reproductive inhibitor to food is the principal treatment method, assuming the proposed application uses oral ingestion. Methodology for determining efficacy in domesticated species are described by Elder (1964), Powell (1966), and Wentworth (1970) for chronic feeding; Jones et al. (1972) and Schafer et al. (1974c) for acute treatment of males; and Wentworth et al. (1968) for the treatment of eggs.

Anesthetizing Chemicals. Laboratory methods for testing a chemical's effectiveness as an anesthetizing chemical are described by Cline and Greenwood (1972), Peek (1966), Schafer et al. (1967), and Schafer and Cunningham (1972).

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AVIAN TOXICANTS—FIELD METHODS

There are 5 published methods that can be used to appraise the efficacy of oral bird toxicants under different application situations: Besser et al. (1967); Crunden et al. (1965); Guarino and Schafer (1967); Royall et al. (1967); and Larsen and Dietrich (1970). Although the methodology described covers basic needs to determine efficacy, more effort needs to be expended with regard to nontarget species.

Acceptable test methodology for determining the efficacy of dermal toxicants, applied as sprays, are readily available: Jackson and Park (1973); Lefebvre and Seubert (1970); Marsh (1964); and U.S. Fish and Wildlife Service (1973). Although these methods may be used for spray applications, they are deficient in information regarding hazards to nontarget species. A single test for contact toxicants is available (Schafer et al. 1969); again, additional data on hazards to nontarget species may need to be provided.

A single published test is available for determining the efficacy of inhalation toxicants (Devore et al. 1966).

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AVIAN REPELLENTS—FIELD METHODS

The determination of the field efficacy of avian repellents is based on 3 main factors—changes in behavior, reduction of bird numbers and a reduction in damage. There are 2 major types of chemical repellents—gustatory and tactile; each requires somewhat different evaluation procedures.

The gustatory repellents, those acting through some physiological mechanism during or after oral ingestion, have been the most thoroughly investigated and appraisals exist for sprouting agricultural seeds (Besser, 1973, Frank et al., 1970, Guarino and Forbes, 1970, Herman and Kolbe, 1971, Ingram et al., 1973, Stickley and Guarino, 1972, West and Dunks, 1969 and West et al., 1969); sprouting horticultural seeds (Abbott, 1958, Royall and Ferguson, 1962); and ripening grain (DeHaven et al., 1973, Dolbeer et al., 1973, Guarino et al., 1973, 1974 and Stickley and Ingram 1973). It is particularly important that minimum plot sizes be established according to the recommendations of Guarino (1972) and Herman and Kolbe (1971) and that replications be used.

Other gustatory repellents are those that induce a behavioral response in a very small proportion of birds causing damage. Four published appraisals contain information: Besser et al. (1973); De Grazio et al. (1971, 1972); and Stickley et al. (1972). Again, test plot size and replications are of prime importance.

There are no published acceptable procedures for evaluating tactile avarian repellents.

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AVIAN REPRODUCTIVE INHIBITORS—FIELD METHODS

Only a few tests on efficacy of reproductive inhibitors have been conducted to date. The variety of species evaluated is limited and the adequacy of test methodology in individual studies is not established. Efficacy determinations require measuring fertility rates of treated and untreated birds and effects on breeding behavior, production and population levels.

Test procedures have been developed for evaluating the effects of reproductive inhibitors in various blackbird species (Bray et al., 1974; Pringer and Granett, 1970; Messersmith, 1971; Peek, 1972; and Vandenbergh and Davis, 1962). In addition to the production studies common to each paper, histological evaluations of treated birds (male and/or female) are outlined by Vandenbergh and Davis (1962) and behavioral aspects are described by Bray et al. (1974) and Peek (1972). Effects on nontarget species should also be included in the test design.

Test procedures are less well developed for field evaluations in pigeons (Shortemeyer and Beckwith, 1970; Wofford and Elder, 1967; and Woulfe, 1968) and should be augmented with data on productivity, histology, breeding behavior and effects on nontarget species.

Procedures are also available for gulls (Wetherbee, 1967).

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AVIAN ANESTHETIZING CHEMICALS—FIELD METHODS

The most important measures of the field efficacy evaluation are percent capture, mortality, the time until anesthesia and the duration of anesthesia. For control programs, population reduction by capture and removal is also important.

Methods for evaluating the effects of anesthetizing chemicals on upland game birds have been described by Mosby and Cantner (1956), Williams (1966, 1967), Williams and Phillips (1972) and Williams et al. (1966). However, additional information, such as hazards to nontarget species and body residues in treated birds, may also be required. Accurate scientific description of measurement parameters must also be used (i.e., g/kg bait *not* g/cup).

Methods for using anesthetizing chemicals to capture waterfowl are also available (Crider and McDaniel, 1966, 1967, 1968 and Crider et al., 1968); however, these methods are not complete and additional information may be necessary. Additional methodology is described for other species of birds commonly found near water (Smith, 1967 and Williams and Phillips, 1973).

Methodology for urban pigeon and sparrow control with anesthetics are well detailed by Murton et al. (1963), Ridpath et al. (1961) and Thearle et al. (1971), although certain aspects (e.g., hazards to domestic animals) may need more documentation. Methodology for the use of anesthetizing chemicals in rural situations are best described by Martin (1967). Murton et al. (1963), Ridpath et al. (1961) and Williams and Phillips (1972); however, hazards to predatory animals may need more documentation.

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RODENTICIDES—ACUTE AND CHRONIC

One of the earliest—and relatively comprehensive—publications available on rodenticides and their efficacy is "Biological Methods for the Evaluation of Rodenticides," Bentley, 1958. In 1963, Kverno and Hood published a volume on the evaluation procedures and standards for screening and developing chemicals for forest rodent control.

Laboratory Methods. The Environmental Protection Agency has developed methods that have been used for establishing laboratory efficacy of rodenticides for commensal rodents. (See Exhibits 1-8.)

Articles concerning laboratory test methodology have been published by various researchers: World Health Organization, 1967; Bentley and Larthe, 1959; Dieke and Richter, 1946; Durbin and Robens, 1964; Emlen and Strecker, 1951; Hayes, 1959; Hankins, et al., 1973; Howard et al., 1968; Loosjes, 1959; Saunders, 1955; Savarie et al., 1973; and Ward et al., 1940.

Field Methods. Emlen and Crow (1951), Miller (1953), Richens (1967), Schein (1950), and Wood (1965) have reported on field studies which utilized techniques or methodology of value to those unfamiliar with setting up field evaluations.

The food preferences of the target species, as well as the acceptance or palatability of the prepared bait will have a direct bearing on efficacy in both the laboratory and field. Thus techniques or methods for measuring food preferences or acceptance should be recognized as an integral part of evaluating a rodenticide for any species. Bentley (1958) discussed palatability of baits in considerable detail. His evaluations included measuring the number of visits to the bait, duration of feeding, amount consumed, and rate of intake. He also included comments on the time of onset of poison symptoms and bait shyness.

Shumake et al. (1971) made comparisons of taste preference studies between laboratory and wild Norway rats. Barnett and Spencer (1953) conducted an extensive study of food preferences of wild Norway rats, and Khan (1974) conducted laboratory experiments on food preferences of the black rat. Other researchers, such as Gregson (1966), Cornwell and Bull (1967), Beer (1964), Patric (1970), Fitch (1954), Joy et al. (1967), and Nass and Hood (1969), have published data which may be valuable to those trying to formulate better rodent baits.

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EXHIBIT 1

TENTATIVE ANTICOAGULANT RAT LIQUID BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill rats must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of liquid anticoagulant rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All rats used in this test shall be Norway rats (*Rattus norvegicus*), wild caught or from a wild rat colony; or albino rats (Wistar Strain preferred). Ectoparasite control with 5% Sevin (1-napthyl-N-methylcarbamate) dust is permissible if applied to both test and control animals not less than 7 days prior to start of test. The test rodents should fall within the following sexually mature weight classes (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weight between sexes
Laboratory rat	150	300	50
Norway rat	175	400	65

3. Pre-test Holding Conditions.

3.1 All rats used in this test method must be held for observation in the laboratory for a period of one week prior to testing. A commercial rat diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50±10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet mix shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners), 5% by weight; Corn oil, 5% by weight. Combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

5. Procedure.

5.1 A test group consists of ten male and ten female rats, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group need be included.

5.2 Provide each cage with a feeder filled daily with the standard TSD challenge diet (4.2).

5.3 Provide each treated cage with equal number of graduated no-drip waterers. Fill half the waterers with tap water and the other half with the test liquid bait formulation diluted with tap water according to use directions. A minimum of 20 ml of each liquid, water and liquid bait, per animal per day should be available. Waterers should be supplied in sufficient quantity to exceed this demand. Replenish liquids as necessary so that both are always equally available to test animals. Reverse position of the waterers daily. The control group shall be provided with graduated no-drip waterers filled only with tap water. Each day record the total quantity of each liquid consumed during the preceding 24 h.

6. Test Period.

6.1 Maintain test period for 15 days, unless a 100% mortality of test rats is recorded prior to that time. Remove dead rats daily or as observed.

6.2 Remove toxicant waterer at the end of the 15-day test period and leave tap-water waterer.

7. Test Period Follow-up.

7.1 Maintain observation on surviving rats for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each rat killed each day during the test period and the five-day post-test period and the amount of liquids consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

EXHIBIT 2

TENTATIVE ANTICOAGULANT MOUSE BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill mice must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of liquid anticoagulant rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All mice used in this test shall be house mice (*Mus musculus*), wild caught or from a wild mouse colony; or albino mice (Swiss-Webster preferred). Ectoparasite control with 5% Sevin (1-napthyl-N-methylcarbamate) dust is permissible if applied to both test animals and control animals not less than 7 days prior to testing. The test rodents should fall within the following sexually mature weight class (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes (grams)
Albino mice	15	30	5
Wild trapped and colony house mice	10	20	3

3. Pre-test Holding Conditions.

3.1 All mice used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial mouse diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50 ± 10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed) 25% by weight; Powdered sugar (10 x powdered confectioners) 5% by weight; Corn oil 5% by weight. Combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

5. Procedure.

5.1 A test group consists of ten male and ten female mice, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group need be included.

5.2 Provide each cage with a feeder filled daily with the standard TSD challenge diet (4.2).

5.3 Provide each treated cage with two graduated no-drip waterers, one filled with tap water and the other with the test liquid bait formulation diluted with tap water according to use directions. Replenish liquids as necessary so that both are always equally available to test animals. Reverse position of waterers daily. The control group shall be provided with graduated no-drip waterers filled only with tap water. Each day record the quantity of each liquid consumed during the preceding 24 h.

5.4 Provide shelter in each cage. Use empty soup or beverage cans with one end removed and slightly flattened to reduce rolling. Use one can per five mice.

6. Test Period.

6.1 Maintain test period for 15 days, unless a 100% mortality of test mice is recorded prior to that time. Remove dead mice daily or as observed.

6.2 Remove toxicant waterer at the end of the 15-day test period and leave tap-water waterer.

7. Test Period Follow-up.

7.1 Maintain observation on surviving mice for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each mouse killed each day during the test period and the five-day post-test period and the amount of liquids consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

EXHIBIT 3

PROPOSED ANTICOAGULANT RAT DRY BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill rats must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of dry bait anticoagulant rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All rats used in this test shall be Norway rats (*Rattus norvegicus*), wild caught or from a wild rat colony; or albino rats (Wistar Strain preferred). Ectoparasite control with 5% Sevin (1-naphthyl-N-methylcarbamate) dust is permissible if applied to both test and control animals not less than 7 days prior to start of test. The test rodents should fall within the following sexually mature weight classes (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weight between sexes
Laboratory rat	150	300	50
Norway rat	175	400	65

3. Pre-test Holding Conditions.

3.1 All rats used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial rat diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 25 to 25 C; Relative humidity, 50±10%; Light, twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners), 5% by weight; Corn oil, 5% by weight. Combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

4.3 When technical or concentrated toxicants are to be mixed, the baits should be formulated by adding the toxicant to the standard TSD challenge diet (4.2) when it is an acceptable carrier as prescribed on the label; otherwise follow label directions.

4.4 Technical grade toxicant normally used at 0.005% concentration should be premixed at the rate of 0.1 g of technical to 99.9 g of cornstarch using the dry dilution method. Technical grade material normally used at 0.025% can be mixed at the rate of 0.5 g of technical to 99.5 g of cornstarch, also using the dry dilution method. These newly formed concentrates can then be further mixed by combining them with the standard TSD challenge diet at the rate recommended on the label (usually 1:19). The weight of rolled oats used in the final mix is reduced by the weight of toxicant and cornstarch added in the final mix.

5. Procedure.

5.1 Ten male and ten female rats are individually caged.

5.2 Water should be available *ad libitum*.

5.3 The rodenticide-treated food and the standard TSD challenge diet are each offered in separate cups in excess of the daily food requirements. The gross weight of each cup and its contained food are determined daily and returned to the starting weight by addition or complete replacement of the given food. Each day record the quantity of each food consumed during the preceding 24 h.

5.4 The position of the bait and the standard TSD challenge diet cups in the cages are reversed every 24 h to counter any feeding position preference of the rats. The test rats have a free choice between treated and untreated food.

6. Test Period.

6.1 Maintain test period for 15 days, unless a 100% mortality of test rats is recorded prior to that time. Remove dead rats daily or as observed.

6.2 Remove toxicant at the end of the 15-day test period and leave the untreated food.

7. Test Period Follow-up.

7.1 Maintain observation on surviving rats for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each rat killed each day during the test period and the five-day post-test period and amount of treated and untreated food consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum of 33% of the food consumed had been treated with the toxicant and if a minimum mortality of 90% is obtained.

EXHIBIT 4

PROPOSED ANTICOAGULENT MOUSE DRY BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill mice must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide and Rodenticide Act, as amended. It is designed to determine effectiveness of dry bait anticoagulant rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All mice used in this test shall be house mice (*Mus musculus*), wild caught or from a wild mouse colony; or albino mice (Swiss-Webster preferred). Ectoparasite control with 5% Sevin (1-napthyl-N-methylcarbamate) dust is permissible if applied to both test animals and control animals not less than 7 days prior to testing. The test rodents should fall within the following sexually mature weight class (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes
Albino mice	15	30	5
Wild trapped and colony house mice	10	20	3

3. Pre-test Holding Conditions.

3.1 All mice used in this test method must be held for observation in the laboratory for a period of one week prior to testing. A commercial mouse diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50 ± 10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; rolled oats (steamed), 25% by weight; powdered sugar (10 x powdered confectioners), 5% by weight; corn oil, 5% by weight; combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

4.3 When technical or concentrated toxicants are to be mixed, the baits should be formulated by adding the toxicant to the standard TSD challenge diet (4.2) when it is an acceptable carrier as prescribed on the label; otherwise follow label directions.

4.4 Technical grade toxicant normally used at 0.005% concentration should be premixed at the rate of 0.1 g of technical to 99.9 g of cornstarch using the dry dilution method. Technical grade material normally used at 0.025% can be mixed at the rate of 0.5 g of technical to 99.5 g of cornstarch also using the dry dilution method. These newly formed concentrates can then be further mixed by combining them with the standard TSD challenge diet at the rate recommended on the label (usually 1:19). The weight of rolled oats used in the final mix is reduced by the weight of toxicant and cornstarch added in the final mix.

5. Procedure.

5.1 A test group consists of ten male and ten female mice, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group needs to be included.

5.2 Water should be available *ad libitum*.

5.3 The rodenticide-treated food and the standard EPA rodent laboratory diet mix are each offered in separate cups in excess of the daily food requirements. The gross weight of each cup and its contained food are determined daily and returned to the starting weight by addition or complete replacement of the given food. Each day record the quantity of each food consumed during the preceding 24 h.

5.4 The position of the bait and standard TSD challenge diet cups in the cages are reversed every 24 h to counter any feeding position preference of the mice. The test mice must have a free choice between treated and untreated food.

5.5 Provide shelter in each cage. Use empty soup or beverage cans with one end removed and slightly flattened to reduce rolling. Use one can per five mice.

6. Test Period.

6.1 Maintain test period for 15 days, unless a 100% mortality of test mice is recorded prior to that time. Remove dead mice daily or as observed.

6.2 Remove toxicant at the end of the 15-day test period and leave the untreated food.

7. Test Period Follow-up.

7.1 Maintain observation on surviving mice for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each mouse killed each day during the test period and the five-day post-test period and the amount of treated and untreated food consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum of 33% of the food consumed had been treated with the toxicant and if a minimum mortality of 90% is obtained.

EXHIBIT 5

PROPOSED ACUTE RAT LIQUID BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill rats must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of acute liquid rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All rats used in this test shall be Norway rats (*Rattus norvegicus*), wild caught or from a wild rat colony; or albino rats (Wistar Strain preferred). Ecotoparasite control with 5% Sevin (1-napthyl-N-methylcarbamate) dust is permissible if applied to both test and control animals not less than 7 days prior to start of test. The test rodents should fall within the following sexually mature weight classes (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes
Laboratory rat	150	300	50
Norway rat	175	400	65

3. Pre-test Holding Conditions.

3.1 All rats used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial rat diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50±10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet mix shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners), 5% by weight; Corn oil, 5% by weight. Combine dry ingredients together, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

5. Procedure.

5.1 A test group consists of ten male and ten female rats, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group need be included.

5.2 Provide each cage with a feeder filled daily with the standard TSD challenge diet (4.2).

5.3 Provide each treated cage with equal numbers of graduated no-drip waterers. Fill half the waterers with tap water and the other half with the test liquid bait formulation diluted with tap water according to use directions. A minimum of 20 ml of each liquid, water and liquid bait, per animal per day should be available. Waterers should be supplied in sufficient quantity to exceed this demand. Replenish liquids as necessary so that both are always equally available to test animals. Reverse position of the waterers daily. The control group shall be provided with graduated no-drip waterers filled only with tap water. Each day record the quantity of each liquid consumed during the preceding 24 h.

6. Test Period.

6.1 Maintain test period for three days, unless a 100% mortality of test rats is recorded prior to that time. Remove dead rats daily or as observed.

6.2 Remove toxicant waterer at the end of the three-day test period and leave tap-water waterer.

7. Test Period Follow-up.

7.1 Maintain observation on surviving rats for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each rat killed each day during the test period and the five-day post-test period and the amount of liquids consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

EXHIBIT 6

PROPOSED ACUTE MOUSE LIQUID BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill mice must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of acute liquid rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All mice used in this test shall be house mice (*Mus musculus*), wild caught or from a wild mouse colony; or albino mice (Swiss-Webster preferred). Ectoparasite control with 5% Sevin (1-naphthyl-N-methylcarbamate) dust is permissible if applied to both test animals and control animals not less than 7 days prior to testing. The test rodents shoud fall within the following sexually mature weight class (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes
Albino mice	15	30	5
Wild trapped and colony house mice	10	20	3

3. Pre-test Holding Conditions.

3.1 All mice used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial mouse diet and water must be available to them at all times. The standard TSD challenge diet mix must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50±10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners), 5% by weight; Corn oil, 5% by weight. Combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

5. Procedure.

5.1 A test group consists of ten male and ten female mice, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group need be included.

5.2 Provide each cage with a feeder filled daily with the standard TSD challenge diet (4.2).

5.3 Provide each treated cage with two graduated no-drip waterers, one filled with tap water and the other with the test liquid bait formulation diluted with tap water according to use directions. Replenish liquids as necessary so that both are always equally available to test animals. Reverse position of waterers daily. The control group shall be provided with graduated no-drip waterers filled only with tap water. Each day record the quantity of each liquid consumed during the preceding 24 h.

5.4. Provide shelter in each cage. Use empty soup or beverage cans with one end removed and slightly flattened to reduce rolling. Use one can per five mice.

6. Test Period.

6.1 Maintain test period for three days, unless a 100% mortality of test mice is recorded prior to that time. Remove dead mice daily or as observed.

6.2 Remove toxicant waterer at the end of the three-day test period and leave tap-water waterer and feed.

7. Test Period Follow-up.

7.1. Maintain observation on surviving mice for five days following test period, reporting unnatural or unusual activities in test report. When testing arsenicals, a ten-day post-test period is recommended.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each mouse killed each day during the test period and the five-day post-test period and the amount of liquids consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

EXHIBIT 7

PROPOSED ACUTE RAT DRY TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill rats must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. It is designed to determine effectiveness of acute dry bait rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All rats used in this test shall be Norway rats (*Rattus norvegicus*), wild caught or from a wild rat colony; or albino rats (Wistar Strain preferred). Ectoparasite control with 5% Sevin (1-napthyl-N-methylcarbamate) dust is permissible if applied to both test and control animals not less than 7 days prior to start of test. The test rodents should fall within the following sexually mature weight classes (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes
Laboratory rat	150	300	50
Norway rat	175	400	65

3. Pre-test Holding Conditions.

3.1 All rats used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial rat diet and water must be available to them at all times. The TSD rodent challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50±10%; Light, Twelve h artificial light per day, not to exceed 2153 lx at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn) 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners) 5% by weight; Corn oil, 5% by weight. Combine dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

4.3 When technical or concentrated toxicants are to be mixed, the baits should be formulated by adding the toxicant to the standard TSD challenge diet (4.2) when it is an acceptable carrier as prescribed on the label; otherwise follow label directions.

5. Procedure.

5.1 Ten male and ten female rats are individually caged.

5.2 Water should be available *ad libitum*.

5.3 The rodenticide-treated food and the standard TSD challenge diet are each offered in separate cups in excess of the daily food requirements. The gross weight of each cup and its contained food are determined daily and returned to the starting weight by addition or complete replacement of the given food. Each day record the quantity of each food consumed during the preceding 24 h.

5.4 The position of the bait and standard TSD challenge diet cups in the cages are reversed every 24 h to counter any feeding position preference of the rats. The test rats have a free choice between treated and untreated food.

6. Test Period.

6.1 Maintain test period for three days, unless a 100% mortality of test rats is recorded prior to that time. Remove dead rats daily or as observed.

6.2 Remove toxicant at the end of the three day test period and leave the untreated food.

7. Test Period Follow-up.

7.1 Maintain observation on surviving rats for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each rat killed each day during the test period and the five-day post-test period and the amount of treated and untreated food consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

EXHIBIT 8

PROPOSED ACUTE MOUSE DRY BAIT TEST METHOD

(This method was prepared by the Technical Services Division, OPP, EPA. The format follows the style requirements of the American Society for Testing and Materials.)

1. Scope.

1.1 Products intended for use to kill mice must be tested to demonstrate rodenticidal effectiveness. This test method is applicable in connection with registration and enforcement procedures under the Federal Insecticide, Fungicide and Rodenticide Act, as amended. It is designed to determine effectiveness of acute dry bait rodenticides applied according to instructions on the labeling.

2. Test Animals.

2.1 All mice used in this test shall be house mice (*Mus musculus*), wild caught or from a wild mouse colony; or albino mice (Swiss-Webster preferred). Ectoparasite control with 5% Sevin (1-naphthyl-N-methylcarbamate) dust is permissible if applied to both test animals and control animals not less than 7 days prior to testing. The test rodents should fall within the following sexually mature weight class (in grams).

	Minimum	Maximum	Maximum acceptable difference in average weights between sexes
Albino mice	15	30	5
Wild trapped and colony house mice	10	20	3

3. Pre-test Holding Conditions.

3.1 All mice used in this test method must be held for observation in the laboratory for one week prior to testing. A commercial mouse diet and water must be available to them at all times. The standard TSD challenge diet must not be used for pre-test feeding.

4. Holding and Test Conditions.

4.1 Temperature, 20 to 25 C; Relative humidity, 50±10%; Light, Twelve h artificial light per day, not to exceed 2153 1x at cage location.

4.2 The standard TSD challenge diet shall be composed of: Cornmeal (whole yellow ground corn), 65% by weight; Rolled oats (steamed), 25% by weight; Powdered sugar (10 x powdered confectioners), 5% by weight; Corn oil, 5% by weight. Combined dry ingredients, add oil, and mix thoroughly. Assure that the mixing utensils are clean of contamination before preparing diet mix.

4.3 When technical or concentrated toxicants are to be mixed, the baits should be formulated by adding the toxicant to the standard TSD challenge diet (4.2) when it is an acceptable carrier as prescribed on the label; otherwise follow label directions.

5. Procedure.

5.1 A test group consists of ten male and ten female mice, group-caged. Include one untreated test group in each test as a control. If a series of tests are being conducted at the same time on the same species, only one untreated control group need be included.

5.2 Water should be available *ad libitum*.

5.3 The rodenticide-treated food and the standard TSD challenge diet are each offered in separate cups in excess of the daily food requirements. The gross weight of each cup and its contained food are determined daily and returned to the starting weight by addition or complete replacement of the given food. Each day record the quantity of each food consumed during the preceding 24 h.

5.4 The position of the bait and standard TSD challenge diet cups in the cages are reversed every 24 h to counter any feeding position preference of the mice. The test mice have a free choice between treated and untreated food.

5.5 Provide shelter in each cage. Use empty soup or beverage cans with one end removed and slightly flattened to reduce rolling. Use one can per five mice.

6. Test Period.

6.1 Maintain test period for three days, unless a 100% mortality of test mice is recorded prior to that time. Remove dead mice daily or as observed.

6.2 Remove toxicant at the end of the three-day test period and leave the untreated food.

7. Test Period Follow-up.

7.1 Maintain observation on surviving mice for five days following test period, reporting unnatural or unusual activities in test report.

8. Calculation and Evaluation of Results.

8.1 Maintain record of weight and sex of each mouse killed each day during the test period and the five-day post-test period and the amount of treated and untreated food consumed. Use grouped data averages for evaluation. The test product is considered satisfactory if a minimum mortality of 90% is obtained.

RODENTICIDES—FUMIGANTS

The information on the test methods or procedures for evaluating fumigants (toxic gases) for rodent control is sparse.

Laboratory Methods. It may be necessary to draw on some of the laboratory procedures used by entomologists or to rely on the methods used to evaluate euthanasia materials for laboratory animals and unwanted cats and dogs. Glen and Scott (1973) for example, describe a simple chamber for the use of carbon dioxide as a means of euhanasia for cats; Smith et al. (1973) describe an apparatus for anesthetizing small laboratory rodents which could be readily adapted to evaluate rodent fumigants under laboratory conditions.

Field Methods. A field test used to evaluate methyl bromide as a fumigant for ground squirrels (Berry, 1938) provides a basis for designing field test methods. A rather comprehensive study on the effects of various fumgants on fleas was conducted by Steward and Mackie (1938). A woodchuck control experiment was carried out by de Vos and Merrill (1957) using gas cartridges. Some early experiments with calcium cyanide on ground squirrels by Sanders (1921) provide some useful field evaluation techniques. Miller (1954) used the open hole test to evaluate a number of potential fumigants for pocket gophers. In the course of research on a method of fumigation using a rodenticide cartridge, simulated natural burrow systems were constructed and tested by Fuhr and Silver (1947).

A test design is needed which can be used to evaluate fumigants in the laboratory and which would be a suitable technique to use for all rodent species that may be controlled with fumigants. Field evaluations will differ widely depending on the species, habitat and intended use practices.

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RODENTICIDES—TRACKING POWDERS

Tracking powders came into use almost by accidents when deaths among house mice were observed in places where insecticides, such as DDT and BHC, were used. Until the ban on DDT, it was used quite extensively for house mouse control. Anticoagulant rodenticides were found effective as tracking powders for both rats and mice and, until recently, were used more in Europe than in the United States.

Little is available on methods for evaluating tracking powders. Bentley (1958) devotes a section of his bulletin to tracking powders, with reference to their evaluation. Szuber and Brodniewicz (1964) provide a drawing of their test cage and the results achieved with some anticoagulant tracking powders. More recently, Tanaka (1973) published evaluations of rodenticides as tracking powders and describes the methods utilized in his studies. Marsh (1972) discusses, in general terms, recent developments in tracking powers.

Laboratory Methods. Laboratory methods for testing tracking powders, using commensal rats and house mice, are being developed.

Field Methods. The literature is generally lacking in field studies for tracking powders; 2 articles from England, however, (Rowe, 1957; Rowe and Chudley, 1963) do provide methods for field evaluation.

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RODENTICIDES—REPELLENTS

Although few repellents are presently used in rodent control, much research was undertaken in the past. Examples of some of the test methods used in evaluating some rodent repellents are discussed; others are cited in the literature. Since repellents encompass such a wide range of effects, a complete coverage is not easily attained and has not been attempted here.

Repellents are generally classed by their intended use, the most common being to protect growing crops, forest trees or ornamentals. Other repellents have been developed for coating seeds to protect them from rodent depredation. Further, a great deal of effort has been expanded on repellents for commensal rats and mice to minimize damage to food packages, textiles and other materials in storage and shipment and to building materials and cables. There are also chemicals which have been explored as area repellents to keep rodents from entering and/or occupying certain areas.

RODENTICIDES—REPELLENTS FOR PROTECTING LIVING PLANTS

Although repellents have been explored over many years to protect growing crops, forest trees and ornamentals from various rodents, such as the squirrel, porcupine, rabbits and hares, few test methods have been reported in the literature.

Cardinell and Hayne (1947) describe field tests for rabbit repellents using treated twigs from apple trees. The experiments were planned to take advantage of the Analysis of Variance methods of statistical comparison. Later, Hayne (1949) described both pen and field tests for protecting gardens from cottontail rabbits. Hooven (1966) provided a technique for evaluating a repellent to protect Douglas-fir trees from hares and rabbits.

Dodge et al. (1967) described an experiment for use under semi-field conditions to test deer and rabbit repellents on trees. They utilized a randomized complete block design and analyzed the data by an Analysis of Variance.

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RODENTICIDES—REPELLENTS FOR PROTECTING SEED

Laboratory Methods. Kverno and Hood (1963) published a method of screening seed protectants. Their testing period, however, was only 3 days, which may have excluded the discovery of many aversive conditioning repellents. Lindsey et al. (1974) conducted laboratory tests on the repellency of Douglas-fir seeds coated with mestranol. He expressed the amount of treated seeds consumed as a percentage of the untreated seeds eaten. Passof et al. (1974) used the percentage of treated seeds cracked open as an index of repellency for deer mice in laboratory tests; less preferred alternate food was provided to prevent starvation should the mice be highly repelled by the treated seeds. Radvanyi (1970) expressed repellency as "percent effectiveness" and calculated his efficacy using the following formula:

$$\frac{\%\text{untreated seeds destroyed} - \%\ \text{treated seeds destroyed}}{\%\ \text{untreated seeds destroyed}}$$

Field Methods. In field studies of conifer seed repellents, the repellency is often measured indirectly by comparing the number of seedlings produced in an area seeded with treated seeds to that of an area seeded with untreated seeds (Passof et al., 1974; Lindsey et al., 1974).

Roy (1961) used a seed spot technique to test a specific seed protectant under field conditions. The difference in the percentage of treated and untreated seed that survived was used to evaluate the results.

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RODENTICIDES—REPELLENTS FOR PROTECTING PACKAGING MATERIALS

Just preceding World War II considerable effort was exerted to develop commensal rodent repellents or deterrents for the protection of paper and cardboard packing materials. A number of laboratory test methods were developed for screening and evaluating chemicals for repellency.

Bellack and DeWitt (1949) published one test method which was used extensively in early evaluations. This test used laboratory rats housed in individual cages and offered 2 food cups: one with a standard laboratory chow; the other with the laboratory chow with the candidate repellents included. The test period was 4 days, and consumption from each cup was recorded daily. Bellack and DeWitt (1949) developed an arithmetic expression that yielded a numerical value for repellency of treated food items with their test procedure. It took into account physiological effects, random feeding and variations of animal weights. Welch et al. (1950) used the same technique and compounds.

Feeding tests became a useful procedure for rapidly screening potential repellents. Barnett and Spencer (1953) used a slight variation of the usual feeding studies by placing the deterrent below the food item, thereby attempting to measure the influence of odor alone as a repellent.

The exposure of chemically treated materials (i.e., containers, etc.) in large enclosures containing rat populations has been used by a number of researchers (DeWitt et al., 1950; Welch, 1951; Welch and Duggan, 1952; Welch, 1954).

Stolurow (1948) reported on a laboratory testing device called the Pittsburgh Obstruction Unit. It was designed for use both in fundamental research concerned with the development of methods and to study the degree of rodent destruction of barriers treated with potential repellents. The basic principles of this method have been used in simpler and less expensive designs for testing repellents on barriers (Bellack and DeWitt, 1950). In 1948, Stolurow prepared a laboratory method for the evaluation of rodent deterrents.

Analysis of the potential repellency of various packaging and structural materials is discussed by Weeks (1959). Rats are offered food on the opposite side of a barrier and are timed to determine how long it takes them to gnaw through. The time required for barriers treated with the test repellent is compared to that required for untreated control barriers. Weeks (1959) developed another repellent test which he calls the graded strip test. A strip of corrugated paperboard is placed over a row of peanuts so that the rat must gnaw through the board to get to the peanuts. The further up the strip the rat gnaws, the less the effectiveness of the repellent. Statistical evaluation was based on the method of biological assay for graded responses used by Burn et al. (1950).

Tigner and Besser (1962) devised a new quantitative method for evaluating chemicals as rodent repellents on packing materials. Tigner (1966) later reported on a series of compounds used to treat multiwall tarps and bags; qualitative method of evaluating the chemicals as potential rodent repellents was used.

A recent paper (Bull, 1972) describes an approach to evaluating attractants and the influence different odors have in inducing Norway rats to feed at given locations. In this study the effect of certain repellents was also examined.

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RODENTICIDES—REPELLENTS FOR PROTECTING WIRE AND CABLE COATINGS

Anthony and Tigner (1967) briefly describe both laboratory and field tests of a repellent used in various types of communication wire or cables. Field studies involved a number of geographical areas, which was essential because of the different rodent species involved. Also, environmental conditions associated with severe cable damage vary from region to region.

Howard (1953) conducted laboratory tests of pocket gophers gnawing electric cables. His test method confined pocket gophers to one part of a cage; a short section of cable was positioned and fastened to block the passageway to the remainder of the cage. By this means data could be obtained for treated and untreated cables and for cables with different types of covering or insulations.

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RODENTICIDES—REPRODUCTIVE INHIBITORS

A reproductive inhibitor can be defined as an agent that can cause permanent or temporary sterility in either or both sexes, or, through some other physiological aspect, reduce the number of offspring or alter the fecundity of the offspring produced.

The numerous compounds capable of inhibiting reproduction in various rodent species have diverse and complex modes of action (Jackson, 1959; Saunders, 1968), many of which do not lend themselves to standardizing either laboratory or field evaluation methods and procedures. Both Jackson and Saunders provide reviews of the capabilities of various compounds.

Because of the intensive search for oral contraceptives for humans, a large number of references are available. The literature cited is concerned with various methods of measuring the physiological effects of different compounds on inhibiting reproduction in a variety of rodent species, particularly those commonly used in the laboratory. A few representative methods and techniques are cited to illustrate what has been used.

Laboratory Methods. Histological evaluations of the effects of chemicals on cellular modifications or makeup of reproductive systems of rodents is a procedure used in some laboratories. However, histological evaluation is laborious and expensive when conducting preliminary testing or screening new compounds (Hershberger et al., 1969). Studies of the testes in treated rats are examples of this method in determining the effects of certain chemosterilants (Pate and Hays, 1968; Ericsson, 1970; Ericsson and Baker, 1970; Gibson et al., 1967).

Many researchers have used the number of pregnant females, implantations and/or the number of rats that ovulated to determine the success of several orally active estrogens and progestins (Kincl and Dorfman, 1965). Banik et al. (1969) made a statistical analysis of the data from the females with ova or implantations using the fourfold contingency test tables of Mainland and Murray (1952). The average number of ova or implantation sites in each rat in the experimental series was compared with those of the controls.

Boris et al. (1971) demonstrated a method which may have merit in establishing more precise effects of compounds on ovulation by using the pubertal ovulation in the rat for the study of anti-ovulatory compounds. Uterotrophic responses as measured by the mean uterine ratio (milligrams of uterus per gram of body weight) is a means of expressing the estrogenicity of certain potential chemosterilants (Rooks et al., 1968; Saunders and Rorig, 1964).

Efficacy of potential rodent chemosterilants can be analyzed in laboratories by using some of the following indices: Average number of days from mating to the appearance of first litters; average total offspring produced per female; average number of litters produced per female (Generoso et al., 1971; Howard and Marsh, 1969). Survival of the offspring and their reproductive capabilities may also be used to determine efficacy expressed in the F_1 generation (Kincl et al., 1965; Clancy and Edgren, 1968). These are not the only criteria for efficacy, but are some of those commonly used.

Where a compound may affect spermatogenesis, efficacy of that compound may be determined by using a serial mating method. This technique involves placing the treated male with 1 or 2 females for a prescribed number of days and then moving him on to new females for a similar period. Thus, by pairing the males with a series of females, it is possible to determine the time period in which sterility occurred and its duration (Hershberger et al., 1969).

Field Tests (Simulated). Tests of a rodent chemosterilant may be conducted in large pens where small populations can be maintained and the tests can be replicated (Kendle et al., 1973; Gwynn, 1972a). Studies should be replicated a number of times under conditions where evaluations of effects can be quite exacting.

Field Methods. All the methods cited have value, although some may be more applicable than others, depending on the characteristics of the compound being tested, the target species and on how the material will ultimately be used in the field.

Marsh and Howard (1969) evaluated mestrano as a reproductive inhibitor in Norway rats in garbage dumps. Two dumps were treated and a third served as a control. The age structure of the rat population and population numbers were the criteria used to determine efficacy. Bowerman and Brooks (1971) carried out pen and field efficacy studies on Norway rats using quinestrol. Gwynn (1972a, 1972b) published pen and field results using still a different rodent chemosterilant.

These represent a portion of the field studies which have been conducted. Field evaluations differ slightly from one another to meet the existing situations and the intended uses of the test compounds.

Significant reproduction inhibition assumes that comparable untreated populations are used as controls to permit a sound statistical analysis. The Chi square analysis of the two-way Analysis of Variance might be the appropriate measure or the significant differences between the treated and control groups. Efficacy tests should be replicated to adequately demonstrate a high degree of reproducible results under various conditions of use. Potential chemosterilants also should be tested in widely separated geographical areas. Because evidence exists that many potential chemosterilants can be quite specific in their effects (Skinner, 1968), all species on which the product is to be used must be tested both in the laboratory and in the field.

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CANDID AND OTHER CARNIVORE TOXICANTS, REPELLENTS, REPRODUCTIVE INHIBITORS AND DEVICES

Research in predator damage control has only recently attempted to provide information on the extent of predation and possible alternative solutions to past and present control methods. Balser (1974a, 1974b) has reviewed the status of coyote control, data on livestock losses and research related to control methodology. His review and others (Cummings, 1966; Howard, 1974; Knowlton, 1972) have pointed to the paucity of data necessary for predator management.

Methods with no undesirable characteristics have not yet been developed. The belief that one method is no better or worse than another is not adequate cause, however, to either reject or justify all control techniques. Depredation control cannot be deferred until ideal methods are identified.

Adverse environmental effects from professionally-employed controls have not been demonstrated (USDI, May 1971; Berryman, 1971), and, conversely, the need for selective professional use of lethal chemicals in predator damage control has been documented (USDI, May 1971; January 25, 1974; May 30, 1974). Experienced professionals recognize the limitations imposed on various mechanical methods by rough terrain, heavy vegetation, adverse weather and other factors. Approval by the Environmental Protection

Agency of Experimental Use Permits to several western States and to the Department of Interior in 1974 for use of toxic chemicals and devices in predator control also acknowledges damage problems that have not been solved by mechanical and nonlethal means.

Changing land-use patterns and land development have affected the habitats and food choices available to both predator and prey animals. Consequently, maintenance of wild animal populations above levels sustained by available natural foods encourages or requires inclusion of domestic products in the diet. Control of animal damage to protect habitats, other wild species and domestic products is basic to sound management and includes regulation of game and non-game populations. It is an essential element in carnivore management and must be considered in the light of current and developing land-use patterns.

Among the larger carnivores that cause damage and resulting management problems are the families Canidae, Felidae and Ursidae. Bobcats (*Lynx rufus*) may prey extensively at times on domestic animals and lynx (*Lynx canadensis*) may occasionally cause damage, but offending animals usually can be managed by mechanical methods. Bears (*Ursus spp.*) and mountain lions (*Felis concolor*) may cause extensive damage at times but are typically considered game animals. Again, offending animals are managed by mechanical methods sanctioned by State wildlife agencies.

The carnivores of primary interest here are gray foxes (*Urocyon cinereoargenteus*), red foxes (*Vulpes fulva*), coyotes (*Canis latrans*), wolves (*Canis lupus* and *C. niger*), feral dogs (*Canis familiaris*) and various hybrids. Those causing most damage problems and concern at present are red foxes, coyotes, feral dogs and coyote-dog hybrids. They are particularly difficult to manage because of their inherent caution, adaptability and high reproductive rates.

Evaluation of the efficacy of various control methods is extremely difficult because of the wide variation in circumstances where controls are applied. Heavily populated areas with small farms present a markedly different environment than open range with large land holdings and few humans. Climate and weather, habitat types, predator populations and reproductive rates, food bases and feeding habits are some of the variables that often prevent replication of experiments under similar conditions. Another major impediment is the lack of adequate census techniques to measure populations and the changes induced by natural and applied controls.

Development of efficacy criteria for control methods will require cognizance of time and cost factors caused by the complex nature of predator-prey ecology and the extreme difficulty in securing uniform replicate field tests. Several years of study over extensive geographic areas under widely-varied climatic conditions will be needed to provide even minimal knowledge of predator-prey economics, behavior and ecology. A review of information and data from field studies and other sources, such as consensus standards under development by the American Society for Testing and Materials, may provide adequate guidelines for protection of nontarget species and the environment. But subjective evaluation will continue to be necessary in predator research and management until much more knowledge is available.

To summarize, effective candid control methods which meet all desired criteria do not exist. Known methods applied to minimize undesirable effects may provide efficacy data and essential damage control. Effective and useful methods vary with time and circumstance and may require removal of specific offending animals or population reduction to achieve adequate depredation control.

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CANID AND OTHER CARNIVORE TOXICANTS

Laboratory methods for evaluating the toxicology and physiology of candidate chemicals are well established and will not be considered here except as related to mode of application. Consensus standards for use now under development by the American Society for Testing and Materials may provide additional guidance in evaluation of efficacy.

Atzert (1971), Crabtree (1962), Robinson (1970), Ward and Garlough (1936), and Ward and Spencer (1947) have summarized toxicology and use patterns for historically used toxic chemicals. Field research data on the use of toxic chemicals to control canid species is limited. Of 92 research projects reported by Knowlton (1973), none included research in this area. Experimental efficacy studies of the M–44 (sodium cyanides spring-loaded ejector mechanism) are now being developed in several western States to evaluate its use in management of red foxes and coyotes.

No specific complete test protocols exist for field evaluation of toxic chemicals for predator management. Survey research data related to domestic livestock losses and relative effects of toxic baiting on coyote populations have been reported by Robinson (1948, 1953a, 1953b, 1961) and by Linhart and Robinson (1972). Effects on target and nontarget species populations are evaluated from trap-catch data and observations. Suggested methods for baiting to reduce hazards to nontarget species are given. Data recorded indicate that reduced coyote populations were followed by increased populations of nontarget carnivore species. Continued use of additional control methods in the survey areas prevents isolation of specific effects of each method. The scope of the reports do provide extremely useful information on the effects of control and animal population trends over a time span.

Arrington and Edwards (1951) employed antelope population surveys to evaluate effectiveness of predator reduction on antelope productivity. Toxic chemicals were the primary reduction method, but overlapping use of more than one chemical and other methods prevented isolation of the effects of each method. Coyote population reduction was reported to result in greatly increased antelope productivity; however, coyote populations were not indexed.

Beasom (1973a, b) discusses relative effectiveness and selectivity of various methods of predator reduction to enhance wild turkey and deer productivity. High selectivity by the M–44 was noted.

Balser, et al. (1968) reported results of a well-designed field study of predator reduction and waterfowl nesting success. Several reduction methods were used. Selectivity is not thoroughly discussed, but a similar design would be useful in evaluating specific methods if experimental areas were adequate.

Field tests of baits must consider food preference and availability to target species. Bait acceptance by extremely wary individuals or species usually requires that the chemical either be masked or be relatively tasteless. Also seasons, weather, temperature and other factors affect bait acceptance.

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CANID AND OTHER CARNIVORE REPELLENTS

Few studies of potential repellents tested on wild carnivores have been reported. Definitive results from laboratory and pen tests are difficult to obtain and are not necessarily representative of behavior in wild free-ranging species under field conditions. In addition, highly variable physical and biological factors may obscure the real effects of potential repellents. Preliminary screening of methods with domestic animals may be useful before evaluation with wild species and field tests if such limitations are recognized.

Nesse (1971) and Swanson and Scott (1973) reported results of limited field trials of the "Gerhardi Livestock Protector" to protect goats and sheep from coyote depredation, but replications were not adequate for accurate evaluation. Pfost (1971) conducted field trials of the Gerhardi device to protect weeder geese from dogs and coyotes. Replications were not uniform, but the study was reasonably well designed.

Gustavson et al. (1974) attempted to induce conditioned aversion in coyotes with lithium chloride; the discussion is not adequate for thorough evaluation. Jankovsky et al. (1974) reported briefly on the results of coyote repellent research in Colorado. Again, discussion of methodology and results is incomplete, and no wildlife census techniques were employed.

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CANID AND OTHER CARNIVORE REPRODUCTIVE INHIBITORS

Few studies have been directed toward management of wild canids by controlling reproduction. A wealth of information has been accumulated from screening tests of potential human contraceptives. These studies and others carried out with rodents, logomorphs, dogs and cats provide a reference source. Preliminary testing on domestic species to clarify physiological effects may be necessary because of difficulty in securing normal reproductive cycles in captive wild species. Pen tests with target species are essential, since separation of physiological effects from those caused by inadequate application techniques and other factors is extremely difficult with highly mobile wild species under field conditions.

Branker (1943) and Jackson (1953) have demonstrated clinical use of diethylstilbestrol (DES) to manage canine mismating. Kennelly (1969) determined abortifacient effects of mestranol in dogs during early gestation. Modification of Kennelly's procedure to determine effects at specific stages in the reproductive cycle is feasible. Balser (1964b) reported abortion in captive coyotes induced by a single oral dose of DES.

Modification of test designs employed by Linhart and Enders (1964) and Storm and Sanderson (1969) to determine reproductive inhibition in captive female foxes is necessary to delineate specific stages of reproduction affected. Additional changes are needed to evaluate chemical effects on spermatogenesis and male fox fertility.

Linhart (1964) reported results of field tests to determine bait acceptance by wild foxes, but the test design does not provide population measurements. Oleyar and McGinnes (1974) conducted field trials of DES to reduce fox reproduction.

Balser (1964b) discussed results of field trials with DES to reduce coyote reproduction. Linhart et al. (1968) reported results of the field trial by Balser (1964) and several others to determine effects of DES on reproduction in wild coyote populations. Inclusion of several trials with the variation in methodology employed prohibits a thorough evaluation. The authors suggest modifications of techniques and application but do not recommend specific methods.

Improved techniques for application of reproductive inhibitors and methods to measure populations are needed. In many wild species, relative indices may be the only feasible method to determine population levels and changes.

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CANID AND OTHER CARNIVORE CONTROL DEVICES

Published research reports on control devices are few. Extensive overlap with toxic chemicals occurs since chemicals are employed in mechanical devices. Devices are also often used simultaneously with other methods. Separation of effects, therefore, is difficult.

Beasom (1973a, b) presents data and discusses the use of the M-44, shooting, steel traps and strychnine baits to remove predators and enhance productivity of wild turkeys and white-tailed deer in specific study areas. Simultaneous use of several methods reduces the value of the data for determining effectiveness and selectivity of the various methods. However, high selectivity was noted for the M-44 and shooting when compared to traps and baits. Predator track counts and rodent snap trap transects were utilized to establish relative population indices, but specific census techniques are not provided.

Robinson (1943) discusses the use of steel traps and the "Humane Coyote Getter" for predator control. The report compares efficiency and selectivity, seasonal and weather effects, age of animals removed, experimental areas, and defects of the methods. Census techniques are not provided except indirectly by indices based on trap catch data. Hey (1964) provides a limited amount of data regarding use and selectivity of the "Humane Coyote Getter" in comparison with other control methods and discusses hazards to nontarget species. No census or index methods are discussed.

Robinson (1953, 1961) and Linhart and Robinson (1972) provide data indicated selectivity of steel traps in relation to species populations and discuss population trends of target and nontarget species in predator control areas. Population indices are taken from trap-catch data. These reports do not provide test protocols, but they include highly useful information for developing test methodology.

Field methods reported by Balser et al. (1968) require adequate experimental area and population indices.

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DOMESTIC DOG AND CAT REPELLENTS AND REPRODUCTIVE INHIBITORS

The number of protocols in the literature for tests of repellency with dogs and cats are limited. A comprehensive search would require consultation with the workers in this field.

Repellents. Huebner and Morton (1964) published a tentative test of efficacy of 5 commercially available dog repellents. Papendeck (1968) conducted laboratory research on capsaicin by spraying the test dogs' muzzles and eyes. The agent produced an aversive response in dogs in the laboratory. Histological examinations showed that the spray did not cause lasting damage to the eyes.

Reproductive Inhibitors. Balser (1964) specified the attributes of an ideal reproductive inhibitor. It must be effective in a single oral dose, offer a wide margin of safety between the effective dose (ED) and the lethal dose (LD), remain chemically stable at an ED of less than 500 mg, be relatively tasteless and odorless, and have a sterility effect for one breeding season. The author's protocol was tried with the synthetic estrogen diethylstilbestrol.

Yasmuth, Rowe, Doege and Bangxang (1970) tested ovarian suppressants for dogs. They subcutaneously administered 2 ml medroxyprogesterone acetate to 60 free-roaming females. Blood tests, counts of mortality and frequency of litters were taken. All females had at least 1 litter before treatment. Observations were made for a year.

Lunnen, et al. (1974) published a laboratory protocol for inducing impotency in male dogs. Male beagles were immunized with a purified bovine lutenizing hormone. The dogs were sacrificed at the end of the experiment. The testes, epididymides and prostate, adrenal, thyroid and anterior pituitary glands were excised and measured for weight differences.

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SKUNK TOXICANTS, REPELLENTS AND REPRODUCTIVE INHIBITORS

Skunks are generally beneficial because they eat insects, slugs, mice and a variety of fruits and berries. In most States, they are listed either as game animals or fur-bearers and cannot be shot, trapped or poisoned without permission from the State game and fish department.

The following skunks occur in the U.S. (Burt and Grossenheider, 1952; Hall and Kelson, 1959): the common striped skunk (*Mephitis mephitis*) is abundant throughout the U.S. and most of Mexico and Canada; the hooded skunk (*Mephitis macroura*) is found in Central America, Mexico and the Mexican border of southeastern Arizona; the hognose skunk (*Conepatus leuconotus*) occurs in Mexico and the Southwest; and the spotted skunk (*Spilogale putorius*) is found over most of the U.S. except the northeastern States.

Toxicants. Lynch (1972) tested kill-efficacy on a large waterfowl marsh divided into 3 areas (a treatment area, a control area and an untreated buffer area between). In the control area he put out simulated duck nest sites with 4 untreated eggs in each nest. In the treatment area each nest site contained 4 treated eggs.

Seyler and Niemeyer (1974) used strychnine-injected eggs for emergency control of rabies in skunks in Montana. They put out scent post lines to determine the population densities of carnivores. They also evaluated the effects on nontarget species.

Repellents. There is little specific literature on repelling or controlling skunks. Scientific methodology of testing has only been worked out for those species where monetary losses, for example, to forestry or agriculture are high.

Reproductive Inhibitors. Some preliminary work on reproductive inhibitors for both skunks and raccoons has been reported (Nelson and Linder, 1972).

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WHITE-TAILED DEER REPELLENTS

Repellents are now widely used in the U.S. In general, 2 types of repellents have been used for deer, the odor repellents and the taste repellents.

There are several methods for testing the efficacy of repellents on vegetation in relation to deer damage. The oldest method has been to lay out line transects and establish plots in treated and untreated areas (Besser and Welch, 1959). The most widely used method (Duncan and Whitaker, 1959), however, is to survey transects in the field on treated and untreated areas. These methods require a long period of time and the results are difficult to evaluate.

Another method involves pen tests where materials are treated and then presented to the test animals. An additional modification consists of providing pens with captive animals and planted blocks of treated and untreated seedlings. These pen tests yield more controlled data. In these experiments, the seedlings are planted in 2½- and 1-acre enclosures holding deer and hares. A control and a repellent planting are used to evaluate the test chemical. Dodge, Loveless, and Kverno (1967) modified the techniques for the planted enclosures. These tests were of randomized complete block design in which 10 blocks with 10 trees per block for each of the treatments were used. The untreated control pen must be observed routinely until 60 to 80 percent of the reference seedlings sustain animal damage.

Campbell and Bullard (1972) devised a preference test design using an apparatus which presents 2 food samples. The arrangement can be quickly changed to offer 2 more small dishes of a test material. These presentations are made so that at least 2 completely different sets of experiments can be executed at one time. Four to 10 deer are routinely tested once or twice daily for 1 or 2 weeks. The test consists of at least 10 to as high as 30 choices. Normally a deer can complete 20 choices in about 6 minutes. The animals are tested against a repellent standard. One objective of the test is to obtain marginal acceptance.

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FIELD CENSUS TECHNIQUES

Population censusing under field situations is essential to adequately evaluate many vertebrate pest control agents. Some means must be used in determining the number of animals before treatment and again at posttreatment to establish efficacy. Censusing techniques are fundamental to all population studies designed to measure the influence of chemicals on the target or nontarget populations.

Censusing techniques for the orders Rodentia and Lagomorpha are numerous and varied. Probably no technique is perfect; each has its strengths and weaknesses. The researcher must make every effort not only to determine which methods of population estimation best suit his purposes but also to apprise himself of all the weaknesses of his chosen methods. This enables the best interpretation of the results within the framework of his outlined test methods or procedures. In a general vein, Murray (1957) warns of the danger of error in most censusing techniques due to the selective distribution of animals according to habitat type within an area being censused. Censusing methods which in themselves affect the population (for example, fatal trapping, shooting, etc.) should not be used unless statistical procedures can be applied to correct for these effects. When practical, more than one censusing procedure should be used.

Many comparisons of techniques are available. Edwards and Eberhardt (1963) tested various methods of estimating a population of cottontail rabbits (*Sylvilagus floridanus*) from live-trapping data against a known population. They suggested, with some qualifications, that linear regression or maximum likelihood estimation (MLE) methods were the most useful. When several procedures were tried on grey squirrels (*Scuirus carolinensis*) in Maryland, Flyger (1959) found that a Schnabel (1938) population estimate, based on what Flyger termed "trap-sight records," was best for estimating the population. He used visual sightings because he felt that it lessened bias injected by trap-shy or trap-prone animals. The Schnabel method is a variation of the Lincoln Index that uses the average of a series of ratios rather than one and is considered, therefore, to be less prone to sampling error. Nixon et al. (1967) also felt that population estimates of squirrels (*S. carolinensis* and *S. niger*) from the Schnabel method were low because of capture frequency variation for different individuals. They preferred the simplified MLE method (Edwards and Eberhardt, 1967).

Robinette et al. (1974) conducted tests of 10 different types of strip censuses. The 3 most satisfactory methods were those of Kelker (1945), Anderson and Pospahala (1970) and King. King's method was described by Leopold (1933) in his book on game management. Hayne (1949) presents a critical evaluation of the King method.

Beaver census techniques are reviewed and evaluated in light of an extensive census operation by Hay (1958). After checking several census methods, he found aerial counting of food caches to be the most practical and reliable.

Forest rodent censusing to determine conifer seed depredation potential provides an interesting example of a situation where the techniques used are not aimed toward absolute enumeration, but toward population indices for use in evaluating rodent control operations. Lines of live or snap traps are often used for these determinations. However, some researchers feel that the "seed-spot" census method is more useful to foresters than trapping because of its relative ease in use (Tevis, 1956; Moore, 1949–50). Tevis discusses the method thoroughly.

It is based on the assumption that the percentage of piles of seeds placed in an area that are disturbed is proportional to the number of seed eaters in that area. Moore gives a key for determining what species disturbed each seed spot.

Emlen et al. (1949) reviewed Norway rat (*Rattus norvegicus*) census methods in some detail and discussed the shortcomings of some of the various methods. Chitty (1942) and Bentley et al. (1957) used wheat consumption as a poulation index for Norway rats in sewers. Rohe (1966) gives guidelines for the censusing of roof rats (*Rattus rattus*); he used snap-traps and nontoxic paraffin-grain bait blocks to test for the presence of rats and their relative numbers. Nelson and Clark (1973) published a method for correcting trapping results by taking into account sprung traps in calculating catch effort. Emlen et al. (1957) and Tester and Emlen (1960) tested dropping boards as a method of obtaining population indices.

Census methods for pocket gophers (*Geomys bursarius*) and moles (*Talpa europa Linnaeus*) are presented by Beck and Hamsen (1966) and Mead-Briggs and Woods mating pocket gophers by counting new signs was also reported by Reid et al. (1966).

When faced with the task of censusing a population, 2 sources for background information are Dice (1941) and Davis (1956). Dice reviews many of the methods for dealing with mammalian populations, and Davis gives an outline of field and laboratory methods for accumulating and analyzing data on rodent populations. In addition to these sources, Chitty and Shorten (1946) present a compilation on the techniques for the study of Norway rats. And, finally, Tepper (1967) compiled a bibliography entitled, "Statistical Methods in Using Mark-Recapture Data for Population Estimations."

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PART VI

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PART VI.—ENVIRONMENTAL CHEMISTRY

INTRODUCTION

The suggested test methods or "protocols" described here were developed from extensive literature searches, workshops and consultations with academic, governmental and industrial experts in environmental chemistry of pesticides. Note that the protocols currently included do not address the fate of pesticides in aquatic or runoff sediments.

The protocols described are considered acceptable for compiling registration data at this time. The remaining discussion in this introduction provides interpretative information on certain environmental chemistry terminology and/or techniques included in the protocols.

The dissipation of pesticides in the environment occurs by various biological, chemical and physical processes, and in general, the test methods described here are designed to characterize the potential environmental significance of these various processes. For purposes of registration, the primary objective of laboratory and field soil dissipation studies should be the characterization of the *rate* and *pathways* (products) of dissipation as opposed to *mechanisms* (microbial versus chemical, etc.). Accordingly, in discussing test methods, the term "dissipation" is used, except where more specific terminology is justified.

Since knowledge of all major products formed is essential, studies with radiolabeled pesticides is necessary. As indicated in the EPA Guidelines for Registering Pesticides, "radiolabeling should be in a strategic portion of the molecule that will remain in the significant degradation products." Usually, but not always, such labeling will involve carbon 14 in an aromatic ring. However, some highly complex pesticides may require radiolabeling at several points in the molecule or with dissimilar isotopes to assure adequate coverage of all chemical transformations. To avoid undue emphasis on the use of any one isotope in preference to another, the more general terms "radiolabel," or "radioactivity" are used in descriptions of suggested methods.

In assembling test methods and protocols, 2 levels of product identification were assumed: Characterization and complete chemical identification. It is important that the material balance be studied during metabolic or photochemical studies, since the quantitative significance of products may then be assessed. Efforts should be made to identify or characterize products that do not appear to be of a transitory nature.

Complete chemical identification implies rigorous and complete establishment of chemical structure and spatial conformation of a molecule by comparison of chemical and physical properties (for example, mixed melting point, spectral measurements, etc.) with those recorded for an authentic specimen. If authentic material is not available, the structure may be postulated on the evidence of instrumental determinations and chemical reactions. The criteria for identification should conform to the standards accepted by reputable chemistry journals. Specific methods for quantitative analysis may be devised after a substance has been completely identified.

Product identification should be conducted on all materials comprising more than 10 percent of the initial application, or 0.1 ppm, whichever is greater at the time of sample analysis. Other products in excess of 0.01 ppm should be identified where feasible. Where such chemical identification is not feasible, attempts should be made to characterize the product. Characterization of unidentifiable products may include such factors as TLC mobility, GC retention time, relative polarity, UV absorbance on TLC (+ or −), radioactive content (percent of original or total recovered), or possible TLC spray reactions.

It is recognized that polar, polymeric, and bound materials present a major problem. In most cases their identity cannot readily be established and their homogeneity is difficult to determine. Their quantitative significance and homogeneity should be investigated through studies of material balance. In the case of bound materials, their distribution between substrate fractions should be examined. (For example, association with certain fractions of soil or tissue may be investigated by classical fractionation techniques.) Chemical studies may not reveal the structure of such compounds, but data may be obtained to support their characterization. Although data, such as ultraviolet spectra, infrared spectra, etc., may not be readily subject to interpretation, the data can form reference points for comparison, confirmation and repetition of experimental studies.

Investigations should be sufficiently thorough to support the characterization of the material in question. For example, the characterization of a photolysis product as "polar" should be based on broader evidence than the fact that it remains immobile in the solvent system chosen for chromatography of the major products. At the termination of a photochemical experiment, for example, data should indicate the relative stability of a compound to light in solution and in the solid states. The structures of the major photolytic products should be characterized, together with their quantitative significance, at several time intervals after the initiation of the study.

Extrapolation of the results of laboratory studies to environmental behavior can be undertaken only with the realization that many pitfalls are involved and that few experiments have been performed to show the failure or success of such attempts.

CHEMODYNAMIC PARAMETERS—WATER SOLUBILITY

The classical definition of a solution is "a homogenous mixture constituting one phase only, of two or more components" (*1*). The application of this definition is clear if a substance forms a true solution in which the particles of solute are of molecular dimensions, for example, sucrose or urea. A suspension or an emulsion, by contrast, contains particles visible to the naked eye or microscope lens. Between these two extremes, however, exist colloidal systems formed by substances of low solubility. The determination of solubility of pesticides may often be complicated by the problem of formation of colloidal systems, since many pesticides are soluble to less than 100 ppm in water (*2*).

Recommended Procedures. It is important that the material under study be as pure as possible, especially if the method of solubility determination involves the analysis of a saturated solution. The method of analysis should be as specific as possible. The determination of radioactivity in a solution of a compound previously crystallized to constant specific activity is one example of a technique for determination of solubility which would satisfy this criterion.

Classical Method.—The classical method (*2, 3*) requires equilibration at the recommended temperature followed by determination of the concentration of material in solution. Use of radioactive material facilitates this measurement. The separation of the saturated solution from the dispersed particles can be achieved by centrifugation. It is recommended that: (1) The centrifugation be carried out at 12,000 g (with temperature control) until there is no change in concentration of the supernatant liquid; and (2) the solubility in water be determined at 3 temperatures—15°, 25° and 35° C.

The effect of pH on the solubility should be studied if the pesticide is acidic or basic, and the pH range studied should encompass the pK_a or pK_b values (*4*).

The work by Gunther et al. (*5*) serves as a primary reference to solubility of pesticides. Not only are solubility values given with references, but also methods are described and examples are given. However, some details of technique are either omitted or bear reemphasis. The following procedure should be followed, in general:

1. Interference of soluble impurities can be minimized by simple expedient of preparing several successive saturated solutions from the same sample of chemical. Solubility values should not change.

2. Some caution should be used in applying filtration to saturated solutions from very slightly soluble chemicals. Adsorption from such a dilute solution may be significant.

3. A recommended technique is to prepare saturated solutions both by shaking the chemical with water at room temperature and by preparing a supersaturated solution (normally at elevated temperature), which is also equilibrated by shaking at room temperature. Both approaches should yield the same solubility value.

Nephelometric Method. The nephelometric method is a rapid method that may be useful for many pesticides especially if radioactively labeled material is not available. The fact that it is rapid not only makes it economically advantageous but also makes it applicable to compounds that decompose slowly in water. An example is maneb, which, because of slow decomposition, releases an ever increasing amount of manganese as it is shaken with watetr. Davis and Parke (*6*) have described a nephelometric method. This method is recommended for compounds possessing solubility greater than 1 ppm and gives only an approximate value. To obtain the true solubility value, another method should be employed.

The method requires a turbidimeter, such as the Hach Turbidimeter 2100, and an ultrasonifier, such as the Biosonic IV. A 1 percent solution of the chemical in acetone or ethanol is used to obtain an initial rough estimate of solubility by observing the presence or absence of turbidity with injection of various amounts of solution into approximately 30 ml water and sonication for 10 sec by a sonic probe. If the suspensions are unstable and quickly coalesce into larger particles, the method will not work for the particular chemical. It is not generally fruitful to search for a stabilizing agent but occasionally gelatin, methocel, etc., may help stabilize the suspension.

If the suspension is stable, a series of suspensions are prepared and sonicated. The sonication is timed by a stop watch and the temperature measured just after the turbidity of the sample is measured. The turbidities plotted against the total concentration should give a straight line. Other concentrations are prepared, as necessary, to define the line and also the "zero" turbidity caused by the water used and by the "insoluble impurities in the chemical sample. In most cases the solubility (point of "zero" turbidity) can be estimated by determining a best straight line either by eye or linear regression. Solubility at other than room temperature can be achieved by use of constant temperature water baths.

Method for Hydrophobic Chemicals. The water solubility of hydrophobic chemicals, such as DDT, where the values are in the range of parts per billion is difficult to measure. Such chemicals take much longer time to reach equilibrium. The following procedure should be adopted (*7*).

Before starting the experiment, it should be determined that the water contains no organic impurity. Such an impurity may be removed by extracting it with an organic solvent then boiling or passing the water through a column containing a suitable resin. The compound under investigation should be dissolved in ether and deposited as a thin layer on the wall of the container (either a large glass container or a carboy). The ether is evaporated and water added.

The system should be stirred slowly and the water analyzed for the concentration of the chemical as a function of time, until a constant value is reached. At this point the stirring should be discontinued and the water analyzed again for the concentration of the chemical. Stirring may cause the formation of aggregates; when the stirring is discontinued, such aggregates may settle down and the concentration of the chemical in the water may decrease. Therefore, additional samples should be analyzed for the concentration of the chemical until there is no further change. This would represent the true solubility of the compound. The analysis of the compound may be carried out using radioactive, gas-liquid chromatography or any other suitable technique.

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CHEMODYNAMIC PARAMETERS—PARTITION COEFFICIENT

Once a pesticide finds its way into a living system, its accumulation and transport, to a great extent, will be governed by its partition characteristics—water solubility, polarity of the molecule, affinity of the chemical towards fats and the nature of the individual biological polymer. The well-known Overton-Meyer hypothesis indicated that lipid solubility of a toxic chemical may be related to its toxicity (*1*). It is now generally accepted that the partition coefficient (defined as the ratio of concentration of the chemical at equilibrium in octanol and water phase) may be related to toxicity and electronic parameters of a compound (*2*). This concept has found considerable application in the development of new drugs. Since pesticides generally possess low water solubility and high lipid affinity, the octanol/water partition coefficient data may provide much information about their distribution, accumulation and persistence in a living system (*3*). Such data also may be helpful in planning toxicological and monitoring studies.

Method. The octanol/water partition coefficient may be determined by the general method described below.

Experiments should be carried out by equilibrating the pesticide in n-octanol/water mixture. Pesticides and *n*-octanol of the purest grade available should be used; the octanol should be distilled. Since octanol has a finite solubility in water, both water and octanol should be equilibrated with each other. The pesticide should be dissolved in *n*-octanol and equilibrated against water. The system should be shaken at constant temperature, centrifuged and the concentration of the pesticide in the *n*-octanol and water phase should be determined by a suitable analytical technique. The time required for equilibration and the ratio of octanol to water will depend on solubility of the compound and will be determined by a trial-and-error method. The partition coefficient is calculated from the ratio of the concentration of pesticide in *n*-octanol and water, after equilibrium. Experiments should be carried out at 2 different concentrations of a pesticide.

Interpretation of Results. If a pesticide has a high partition coefficient, it is likely that it will bioaccumulate or be persistent. If the partition coefficient is greater than 100, a fish bioconcentration experiment may be indicated. If, on the other hand, the partition coefficient is less than 10, bioconcentration is unlikely.

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CHEMODYNAMIC PROPERTIES—DISSOCIATION CONSTANTS

The dissociation constants of acidic and basic pesticides in water are essential to understanding their environmental behavior. The relative distribution of undissociated, cationic or anionic species of a pesticide can affect its availability in such processes as oxidation-reduction reactions, ion exchange, coagulation, adsorption and leaching (*1, 2*).

Numerous methods for determining dissociation constants have been used and are briefly reviewed by Nelson and Faust (*1*). The usual method is to conduct a potentiometric titration of the chemical with strong acid or base as required (*1*); however, potentiostatic (*3*) or spectrophotometric (*4*) methods might also prove useful.

METHODOLOGY

Materials. (1) The pesticide should be analytical reference grade. (2) For titrants, standardized 0.10 *N* NaOH is prepared and the sodium carbonate and carbon dioxide are eliminated by conventional techniques in addition standardized 0.10 *N* HCl is also prepared. (3) For ionic strength control, sodium perchlorate or potassium chloride may be useful.

Equipment and Procedure. An expanded scale pH meter is used with glass and saturated calomel electrodes. The instrument should be standardized and linearized against standard buffer solutions. The temperature should be monitored constantly and maintained within 25° ± 0.1 °C. Titrations are performed under an atmosphere of nitrogen that is run through sodasorb and distilled water. This technique prevents evaporation of the titrant solution.

The steps below provide the necessary data for calculating the acidic dissociation constants. The determination of basic dissociation constants will correspond with the substitution of HCl for NaOH.

Plot *pH* versus volume (ml) of NaOH to yield the typical S-shaped titration curve for a monobasic acid. If the acid is polybasic, there may be more than one inflection point.

Plot the Δ pH/Δml versus average volume (*ml*) of titrant to yield the first derivative curve which, in turn, reveals the equivalence point or point of inflection of the titration curve.

In the S-shaped curve, choose a point above halfway to the equivalence point, where a well-buffered region exists. In this region, the concentration of the undissociated acid is approximately equal to the concentration of the anion, and the *pH* change is small with each addition of NaOH. Consequently, there is less chance for error in the *pH* reading. The chosen point yields values for $[H_3O^+]$, *V*, and *v* for insertion into the equation:

$$K=\frac{[H_3O^+]\left([H_3O^+]+\frac{Mv}{V}\right)}{\frac{M}{V}(V_{e-v})-[H_3O^+]} \qquad (1)$$

where

$[H_3O^+]$ = hydronium ion concentration.
K = classical or concentration dissociation constant.
M = normality of NaOH.
v = volume of titrant added, i.e., the buret reading.
V = total volume.
V_e = theoretical volume of titrant added at the equivalence point, calculated from the weight of acid pesticide used.

This equation yields the classical or concentration acidic dissociation constant, which varies with ionic strength. If the acid under investigation is polybasic or the dissociation constants are close together, then the equation cited above should be modified accordingly. If it is assumed that activity coefficient equals 1, then $(H_3O^+) = [H_3O^+]$ and $pH = -\log [H_3O^+]$. Equation 1 is a straightforward derivation from the law of electoneutrality and appropriate substitutions. The $[OH^-]$ curve was assumed to be small and negligible in the portion of the titration curve from which the calculation of *K* was made.

A theoretical titration error at the equivalence point can be calculated from:

$$\frac{V_e-V_q}{V_q}\times 100 = \text{percent titration error} \qquad (2)$$

where V_e = actual volume of titrant added at the equivalence point.

Classical *K* values as calculated from Equation 1 by Nelson and Faust (*1*) are listed in Table 1 for several ionic strength values. A comparison of the values with those reported in the literature by other investigators is presented in Table 2. For more accurate measurements of pK_a and pK_b, appropriate corrections for the influence of ionic strength may be necessary (Table 1).

TABLE 1.—*Acidic dissociation constants* (K) *at various ionic strengths* (I)

[From: reference 1]

Compound	I	K	Theoretical titration error (percent)
Dalapon	0.02	1.25×10^{-2}	−1.15
	0.05	1.45×10^{-2}	
2,4-D	0.01	1.7×10^{-3}	+0.34
	0.05	1.86×10^{-3}	
2,4,5-T	0.012	1.29×10^{-3}	+0.47
	0.03	1.31×10^{-3}	
2-CPA	0.02	1.04×10^{-3}	−0.36
	0.05	1.20×10^{-3}	
4-CPA	0.02	1.0×10^{-3}	−1.18
	0.05	1.12×10^{-3}	
MCPA	0.012	8.07×10^{-4}	−0.57
	0.03	8.82×10^{-4}	
Fenac	0.02	1.60×10^{-4}	−1.10
	0.05	1.98×10^{-4}	
MCPB	0.02	1.4×10^{-5}	+1.00
	0.05	1.5×10^{-5}	

TABLE 2.—*A comparison of* pK *values reported for the herbicides*[1]
[From: reference 1]

Reference	Method	pK 2,4-D	pK 2,4,5-T	pK 2-CPA	pK 4-CPA	pK MCPA	pK MCPB	pK Fenac	pK Dalapon
1	Potentiometric	2.73	[2]2.88	[3]2.92	[3]2.95	[3]3.05	[2]4.80	[3]3.70	[2]1.84
5	do	2.81	2.57						
6	do	2.96							
7, 8	Conductrometric			2.99	3.02				
9	do	2.64				3.28			
10	do	2.90	2.83		3.01	3.11			
11		2.92							
12	E.M.F			3.05	3.10				
13		3.28							
14	Literature review	3.31	3.14		2.36			3.87	1.53
15	do	2.63	3.14		3.56	2.90	4.86(60°)		
		2.80	3.46(60°)			3.40	6.21		
		3.22(60°)							
		3.31							

[1] Temperature=25° C unless otherwise stated.
[2] $I=0.03$.
[3] $I=0.05$.

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CHEMODYNAMIC PARAMETERS—ADSORPTION

Adsorption of pesticides to soil colloid surfaces has a major effect on the transport process and bioavailability. Accordingly, its importance has prompted many reviews (1–6), which should be consulted for a more detailed inquiry.

Adsorption reduces the concentration of a pesticide in solution. The resulting relative distribution between the adsorbed and solution phases depends on factors such as: the chemical parameters of the pesticide molecule (including pK_a or pK_b, size, shape, configuration, water solubility, and polarity); the soil properties (including the amount and type of clay and organic matter, surface area, soil structure, and soil pH); and soil temperature, water content, and salt concentration. Soil organic matter content is probably the most important single soil variant for nonionic pesticides.

Adsorption Model. The pesticide distribution represents a dynamic equilibration between adsorbed and solution (or desorbed) phases. The kinetics of these opposing reactions become important in modeling a leaching situation. Desorption may exhibit hysteresis, that is, a slower rate of release than that of adsorption, and some apparent irreversibility.

Adsorption equilibria have generally been described by the empirical Freundlich equation:

$$C_s = K\, C_w^{l/n} \tag{1}$$

or

$$\ln C_s = \ln K + \frac{l}{n} \ln C_w \tag{2}$$

or

$$\log x/m = \log K + \frac{l}{n} \log C_e \tag{3}$$

where C_s is the amount (x) of adsorbed pesticide per unit amount of adsorbent (m); $C_w = C_e$ is the equilibrium solution concentration of the pesticide; and K and n are constants. The Freundlich adsorption coefficient, K, can be obtained by plotting log x/m versus log C_e, yielding a linear curve of slope l/n. The units of x/m and C_e are often in $\mu g/g$ and $\mu g/ml$, respectively. When C_e is 1 ppm (1 $\mu g/ml$), the corresponding value of log x/m is equal to log K. Deviation of the value of n from l, a common observation, reflects the nonlinearity of the adsorption process. If n were l, the K would be identical with the partition coefficient.

Adsorption Techniques. The typical method of conducting soil-pesticide adsorption studies is by the "batch" or "slurry" technique, such as that described by Weber (*7*). Air-dry soil is shaken with an aqueous pesticide solution until equilibrium is attained in the final solution concentration. This is measured by analyzing the supernatant after centrifugation. If degradation of the pesticide does not occur during this time, direct measurement of total radioactivity is usually the most convenient and accurate analytical procedure. To obtain the adsorption isotherm, a series of pesticide solutions are equilibrated with soil at constant temperature, and the amount of pesticide adsorbed is plotted as a function of equilibrium pesticide concentration.

Other methods used for adsorption studies have included continuous-flow equilibrium techniques (*8–10*) and a dialysis technique (*11*) in which the soil suspension was kept within dialysis tubing to retain lower molecular weight fractions (which would not be sedimented by centrifugation).

The adsorption coefficient, *K*, is commonly reported on a whole soil basis. Hamaker and Thompson (*3*) have compiled such data from many investigations; the results for individual pesticides have great variation, reflecting in part the various soils and experimental conditions. Distribution constants ranged from *O*, for dicamba, to 14,000, for DDT. One method for standardizing adsorption data is based on the high correlation of adsorption with soil organic matter content. Thus the Freundlich *K*, divided by the percent soil organic matter content, yields Q, a value expressing the μg of pesticide adsorbed per gram of organic matter. Some authors (*3*) prefer the expression K_{oc}, i.e., adsorption based on organic carbon content, since this quantity is determined without the additional conversion factor (commonly 1.724) needed to derive soil organic matter content.

Relationships Between Adsorption and Pesticide Behavior. Osgerby (*12*) has attempted to model the availability of herbicides for plant root uptake. Of more direct environmental concern is the relationship between adsorption and leaching. This is discussed in part in the protocol describing laboratory leaching tests. Guth (*13*) plotted the penetration depth of several triazine and phenylurea herbicides against their *K* value and obtained a good correlation between these two parameters. He concluded that on addition of 20 cm "rainfall" to soil columns, pesticides whose *K* was greater than 20 would remain in the upper 2-cm zone, whereas those whose *K* was less than 1 would leach deeper than 30 cm. Decreasing soil pH tends to increase adsorption (and decrease leaching) for ionizable and polarizable compounds.

Adsorption coefficients, in addition to having merit in the prediction of pesticide mobility, may also be useful in estimating volatilization losses. This is discussed more fully in the protocol on volatilization.

PROTOCOL FOR ADSORPTION TESTS

Soils. Reference soils should be used if available. The same soils used in laboratory leaching tests are logical choices for adsorption measurements. Use a minimum of 4 soils, encompassing a range of soil organic matter contents and textural characteristics. Soil *pH* should be in the range of 4.5 to 7.5. If the pesticide structure and physical properties suggest its adsorption will be pH-dependent, testing should include a fairly acidic soil as well as a soil of neutral-to-slightly alkaline *pH*. If anticipated use warrants, a muck should also be tested.

In the absence of reference soils, those from regions of major pesticide use, including those soils available for field plot testing, would be logical sources.

Apparatus. Apparatus includes a high-speed centrifuge, shaker (preferably in a water bath unless ambient temperature is relatively constant and near 25°C), and appropriate sample containers. For nonanionic pesticides, glass containers are preferred. Because anions may adsorb to glass in significant amounts, polypropylene containers are preferable for these. Other details of container design are not critical, except that the liners of screw caps should be Teflon. Test tubes with screw caps are convenient since they may be centrifuged directly, using an appropriate rubber adapter, and eliminate a transfer step.

Method. This protocol is based on the batch method. Additional methods and related details may be found in the references cited.

1. Soil preparation. Soils are sieved at less than 500 μm to remove stones and large plant fragments and coarse sand (500–2,000 μm). Although unlikely to directly contribute to adsorption, this quantity can be weighed and later accounted for when adsorption is determined on a whole soil basis. Soil characteristics (as discussed in the laboratory leaching protocol) should be reported here or elsewhere in the registration application. The water content of each air-dry soil should be measured by drying subsamples, at 110°C, to constant weight.

2. Pesticide solutions. Use at least 3 concentrations, 0.1, 1, and 10 ppm (if solubility permits), in aqueous 0.01 N $CaSO_4$ solution. The pesticide should be unformulated. In addition, a blank solution (0.01 N $CaSO_4$ only) should be included for each soil. Inclusion of a reference chemical whose adsorption coefficient is similar to the pesticide being tested is advisable.

3. Procedure. Use a ratio of 4 solution:1 soil, with the soil weight *based on* oven-dry weight (but do not use previously oven-dried soil). For example, 10 ml solution added to 2.5 g soil may be a convenient amount. Immediately after addition of the solution, agitate the container vigorously by using, for example, a vortex mixer. Subsequently, shaking is continued at a sufficient rate to keep the soil in suspension. The adsorption experiment should be run at 25°C, so a shaker water bath may be desirable. Each run should be duplicated, with additional replicates as needed for reliability of the data. Equilibration should be for 24 hr unless the chemical degrades rapidly. In such cases, only 2–4 hr may be needed, with possible analysis of both soil and equilibrium solution to verify the amounts of parent and breakdown products. After the period of equilibration, suspensions are centrifuged at high speed and an aliquot(*s*) carefully removed for analysis. Direct analysis of carbon 14 pesticides, by liquid scintillation techniques, is very convenient, but other appropriate methods may be used.

4. Data presentation. Average values of the adsorbed pesticide, x/m, should be plotted as a function of equilibrium concentration, C_e, according to Equation 3. C_e is obtained directly in $\mu g/ml$ (or ppm) from the solution analysis. The amount of pesticide adsorbed per gram of soil, x, is obtained by:

$$x=\frac{(C_0-C_e)\,V}{m} \qquad (4)$$

where C_0 is the starting concentration ($\mu g/ml$), V is the solution volume (ml), and m is the soil weight (g). The Freundlich constant, K, and the constant n can be evaluated from the adsorption isotherm. At $C_e=1$ $\mu g/ml$, the corresponding value of x/m should be reported as K. The adsorption coefficient may *additionally* be reported as Q or K_{oc} by the equations:

$$Q=\frac{K\times 100}{\%\text{ soil organic matter}} \qquad (5)$$

or

$$K_{oc}=\frac{K\times 100}{\%\text{ soil organic carbon}} \qquad (6)$$

The final tabulation of data should therefore, include K, $1/n$, and Q or K_{oc} (if determined) for the pesticide in each soil. Reference chemical data is included as well.

5. Desorptive studies. Experiments should also be carried out to study the desorption of pesticides. Studies could be accomplished by adding water to soil containing absorbed pesticides, equilibrating, and then analyzing the concentration of pesticide in solution. The desorption data may also be treated by the Freundlich isotherm.

6. Optional experiments. Basic studies on adsorption could be expanded, but are not required, to include other temperatures, additional soils (especially where soil *pH* varies or is modified), time to reach equilibrium, and additional reference compounds. A broader concentration range may be used in better defining the adsorption isotherm. Giles (*14*) offers useful information on interpretation of adsorption mechanisms based on the shape of the isotherm.

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HYDROLYSIS STUDIES

Organic pesticides may enter natural waters via such routes as direct applications to control aquatic weeds, trash fish and aquatic insects; leaching and runoff from agricultural lands; drift from aerial and ground applications; discharge of waste waters from manufacturing plants; and discharge of waste waters from cleanup of equipment used for pesticide formulations and application. Thus, a knowledge about the mobility and degradation of pesticides in aquatic environments is necessary because it has a direct bearing on their persistence in waters and soils. Pesticide hydrolysis data will be helpful in understanding pesticide degradation in water; the impact on the choice of formulation technology, transportation and storage procedures; and pesticide disposal (*1–3*).

The following is a suggested protocol for the study of chemical hydrolysis of pesticides in aqueous environments.

Materials and Methods. A radiolabeled preparation is a preferred way of studying the hydrolysis of pesticides. The position of the radiolabel must allow detection of the hydrolysis products. In such cases, the identification of hydrolysis products, disappearance of the parent pesticide and appearance or disappearance rates of the hydrolysis products can be readily determined through thin-layer chromatography (TLC), TLC-radioautography, liquid scintillation counting (LSC) and related radiotracer methodologies.

Hydrolysis studies can also be conducted using nonradioactive compounds. If a nonradioactive pesticide is used, the rate and extent of its disappearance in an aqueous system may be determined by appropriate analytical procedures, such as gas liquid chromatography (GLC), spectrophotometric determinations, etc.

Hydrolysis experiments will be conducted at constant temperature in darkness. An initial range-finder probe may be run to choose appropriate time intervals for the final experiment. At least 4 sampling times, with at least one observation made after half of the parent pesticide is hydrolyzed, are recommended.

Temperatures.—Three temperatures should be used: 25°C (77°F), 35°C (95°F) and 45°C (113°F). A certain degree of extrapolation of the rates obtained at 25°, 35° and 45°C is possible. If very little or no hydrolysis occurs at 45°C, experiments may be carried out at higher temperatures.

Concentration of the Parent Pesticide. Two concentrations are recommended. The higher concentration to be used depends upon the limits of pesticide water-solubility and the lower concentration used based on the sensitivity of the analytical method to detect the parent pesticide and/or its hydrolysis product(s). In any event, the higher concentration should not exceed 250 ppm. The lower concentration should be approximately $\frac{1}{10}$ that of the higher concentration. The inclusion of 2 concentrations in this protocol will lend support to the assumption that, under the present experimental parameters, first-order kinetics describe the hydrolysis reaction.

pH Values. Three pH values will be studied: 3, 6 and 9. The pH measurements on 49 different soils demonstrated that this range would include a majority of agriculturally important soils. The pH and ionic strength of the reaction solution should be maintained by the use of suitable buffers. (*4*).

Experimental Procedures. All solutions should be incubated at the desired temperatures in sterile sealed glass containers for appropriate times in darkness. For analysis, each solution should be extracted with appropriate organic solvents, if required, and the qualitative and quantitative determinations on the parent pesticide and/or its hydrolysis products should be performed using appropriate analytical procedures. Each experimental point should be studied in duplicate.

Calculations and Discussion. The hydrolysis data should be treated with simple first-order kinetics, and the rate constant and half-life should be calculated (*5*). The activation energy of the process should be determined from the temperature dependence of the rate constant. In cases where the first-order rate law is not applicable, the hydrolysis data should be treated with the second-order or other kinetic scheme. A study by Gomma et al. is one example of the presentation of hydrolysis data.

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PHOTOCHEMICAL STUDIES

The action of sunlight may destroy or chemically alter pesticides in the environment. The rate of breakdown and the potential of the products to contaminate the environment influence the usefulness of the parent compound. Environmental photochemistry is complicated by the possible interaction of the reacting molecule with many environmental components. Laboratory experiments are necessary to obtain comparative data under standardized conditions and to understand the effect of factors that might modify the rates and products of reaction.

General Procedures. The enumeration below lists the stages of a model photochemical investigation. States 1 through 6 indicate general procedures suitable for an investigation of solution phase photolysis.

1. Measurement of the absorption spectrum of the unknown compound to identify the spectral regions that might cause photochemical change.
2. Selection of light source, wavelength range and apparatus for irradiation.
3. Choice of solvent and concentration of the reactant.
4. Irradiation of the mixture, with periodic sampling, to measure rate of disappearance of the starting material and observe the appearance of products.
5. Quantitative and qualitative analysis of products after a selected period. Identification of unknown compounds.
6. Study of modifying factors; for example, effect of physical state, effect of triplet and other sensitizers, effect of oxygen, effect of pH and solvent, effect of adsorption on soil or silica.

Applicable Theory. There are 2 fundamental laws of photochemistry: The first is the Grotthus-Draper law which states that only the light absorbed by a molecule is responsible for reaction. The second is the Stark-Einstein law which states that the absorption of light by a molecule is a one-quantum process, so that the sum of the primary quantum yields, must be unity (*1*).

Elaborate experimental techniques are necessary for the investigation of quantum yields. The area that has received major attention from the theoretical standpoint is that of atmospheric photochemistry, where consideration can be given to the reactions of low concentrations of organic molecules in the vapor phase (*2*). Quantum yield measurements of organomercurial compounds in water lead to predictions of reaction rate in reasonable agreement with those determined environmentally in natural waters (*3*).

In the environment, "sensitized" processes may be important. In such a case, light is absorbed by a "sensitizer" molecule which adopts an excited electronic configuration. This excited electronic state possesses a relatively long life time during which the molecule can transfer energy to a molecule of another species which does not absorb light in the same region as the sensitizer molecule. Thus, a molecule which does not absorb light in the visible region of the spectrum may undergo reaction in the presence of a sensitizer absorbing at longer wavelengths (*4-7*).

Rates of photochemical reaction are not usually influenced by temperature to any appreciable extent; however, the study of rate of photolysis is complicated by the formation of photoproducts. These absorb light in competition with starting material. It is therefore more meaningful to measure rates of disappearance until not more than 20 percent of the starting material has been consumed and to use low concentrations. At high concentrations polymeric materials may be formed. Concentrations to be expected in the environment will be low (10^{-9} to $10^{-6}M$); therefore, studies at low concentrations will provide more relevant information. Disappearance rates of organic compounds as a result of photolysis in very dilute aqueous solution can be represented by a first-order rate law.

Influence of Environmental Factors. Water is the predominant solvent for the study of photochemical reactions in the environment. Organic solvents frequently used for photochemical studies include methanol, acetone, benzene, isopropanol, hexane, acetic acid, ethyl acetate, and cyclohexane. The ability of some of these solvents to transmit light of shorter wavelengths is limited. Methanol or hexane, however, are examples of solvents which transmit an appreciable amount of energy at 220 nm.

Benzene and acetone absorb light and are capable of acting as sensitizers. The presence of acetone in aqueous solutions may be sufficient to cause photosensitized reaction of other molecular species (*8, 9*). The presence of sensitizers in "natural" waters has long been suspected and there is increasing evidence that, although some photochemical reactions do not occur in distilled water, photoproducts may be obtained in "natural" water as a consequence of sensitized reaction (*10*).

Solvents do not merely serve to dilute the reacting species. Many can participate in the photochemical reaction. Irradiation of *o*-chlorobenzoic acid proceeds by the formation of a radical or excited species which reacts with the solvent. In methanol, this radical abstracts a hydrogen atom and benzoic acid is the major product. Methanol, isopropanol, hexane, and a number of related solvents function as hydrogen donors. By contrast, benzene forms a new carbon-carbon bond and photolysis of *o*-chlorobenzoic acid in benzene gives *o*-phenylbenzoic acid (*11*).

In addition to the influence of solvent, the presence or absence of oxygen also influences the course and products of reaction. In practice, the total exclusion of oxygen requires rigorous procedures that are rarely adopted (*1*), but, by bubbling oxygen-free nitrogen through the solution, the effect of anaerobic conditions can be studied. Oxygen adds to radical sites and competes with other reagents for these sites. Comparison of the photolysis of DDT and DDE under oxygen and nitrogen shows that photo-oxidation reactions predominate in the former case (*12*). Oxygen is itself a diradical and, in light, it is capable of reacting with other systems, energy transfer to oxidizable subtrates, direct free-radical reactions or excitation to an activated species (*13*).

Photochemical studies of pesticides have been performed on thin layers of pure material deposited on glass plates, on silica-gel coated glass plates or on thin layers of soil. There are few reported studies of photolysis on soil, but the rate of photolysis appears to be slower than that on silica under comparable conditions (*14*).

Photolysis has been done on silica-gel coated plates and the products have been subsequently examined by thin-layer chromatography. However, changes in absorption spectra have occurred in pesticides deposited on silica-gel (*15*). Such spectral changes are a general phenomenon and depend on the nature of the compound (*16*). Silica is an acidic polar medium. It interacts with organic compounds through hydrogen bonding and dipole-dipole forces. Soils and clays might be expected to exhibit weaker interactions, if any, and there is little information on the spectral changes to be anticipated when pesticides are deposited on soil, clay or other surfaces. Therefore, the extension of photochemical information obtained by studies on silica-gel coated plates to environmental situations should be carefully interpreted.

Experimental Techniques. Although the argument may be raised as to the value of "model" or laboratory photochemical experiments in providing a guide to environmental behavior, valuable information may be obtained using a relatively limited range of conditions. Environmental samples are exposed to light under a wide variety of conditions: absorbed on dust; as solids on foliage or soil; dissolved in water; dissolved in organic films on water surfaces; in the vapor phase, etc. Studies of photochemical behavior under such a variety of conditions would be impractical. Discussion of environmental influences requires basic information that can only be obtained in controlled experiments.

Photolysis of pesticides has been investigated in vapor, solution and solid phases. Descriptions of experiments on vapor-phase photolysis of pesticides are limited in number (*17, 18*). Discussion has therefore been limited to photolysis of solids and solutions.

Natural sunlight and artificial light sources have been used for the study of photochemical reactions. The value of experiments in sunlight is that the reactions observed are those that may be expected to occur in the environment. Unfortunately sunlight is extremely variable. Wavelengths and intensities depend on latitude, climate, horizon geometry, near ground distribution of aerosol and gaseous pollutants and many other factors. Thus it is difficult to ensure the reproducibility of experiments performed in natural sunlight, and artificial sources are necessary to standardize conditions and measure rates of reaction. If studies are performed in natural sunlight, it is usual to carry out parallel experiments with artificial light sources for purposes of comparison, control and precise recording of experimental variables. Arc lamps and fluorescent lamps are preferred sources for photochemical experiments since they are good sources of ultraviolet radiation.

The mercury arc is one of the most frequently used artificial light source for photochemical experiments. There are 3 types of mercury arc: low-pressure, medium-pressure and high-pressure. The light from the low-pressure or "resonance" lamps is rich in 253.7 nm radiation (also in 184.9 nm radiation if a "suprasil" quartz envelope is used). They require no special cooling and are often used for photochemical research. The medium-pressure mercury arc is a more convenient source of wavelengths above 260 nm.

Protocol for an Environmental Study. Rate studies should be conducted initially at a concentration in the range of 5 ppm (or lower) in distilled water at 25° C. The use of radioactive material may facilitate the investigation of photoproducts. Periodic sampling should be carried out from zero time in order to measure the rate of disappearance of the parent compound and decay of major photoproducts. Conditions should be essentially aerobic, i.e., excess oxygen should be present during the irradiation. (It may be necessary to bubble air through the liquid.) An estimate of the material balance at the completion of the experiment will indicate whether loss of volatile material has occured. It may be necessary to trap volatile products for identification, if these represent a significant proportion of the photoproducts.

Borosilicate vessels are adequate for these studies. A reactor, such as the Rayonet photochemical reactor, permits the exposure of several tubes under uniform conditions of illumination. Alternatively, reaction vessels utilizing light sources housed in a cooled well may be used (*19*). The ability of glassware to transmit light varies from batch to batch. For calibration of the performance of light sources and glassware a chemical actinometer is recommended.

The photolysis should be continued until sufficient data points are obtained to indicate the half-life of the parent compound. In each experimental design a reference substance should be included to obtain a relative indication of half-lives under similar conditions of illumination.

Studies should be carried out in the laboratory under controlled conditions using an artificial light source emitting wavelengths greater than 280 nm, a source equivalent to natural sunlight, or in natural sunlight. Efforts should be made to identify or characterize products that do not appear to be of transitory nature.

Since differences in products and reaction rates may be observed between sensitized and unsensitized photochemical reactions (*20*), experiments should also be performed using distilled water containing 2 percent acetone. Acetone is a triplet sensitizer and may mimic the sensitizing effect of (unknown) dissolved substances present in natural waters which are also capable of sensitizing the reaction. Studies a high and low pH in buffered aqueous solution may also be required to provide further information on stability to light.

Since the quantities of material obtained in the rate study may be inadequate, product identification may be accomplished in parallel experiments. Changes in experimental conditions, such as wavelength of light and concentration of starting material, will influence the course of the photochemical reaction. However, such changes may afford improved yields of photoproducts for structural studies. The objective of parallel experiments is primarily the identification of photochemical products observed in the course of the rate study.

Additional photochemical studies on silica-gel or soil coated thin-layer glass plates are optional and may be carried out for a particular compound, if desirable. Caution should be exercised in interpreting these data.

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LABORATORY LEACHING STUDIES

Leaching of pesticides implies the movement of these chemicals through soil, usually by a mass transport process. The depth and concentration of a pesticide within the upper 20 cm has particular implication for pesticide efficacy. Of greater environmental concern, however, is the possibility of movement to and contamination of groundwater or drainage effluent.

Degradation, which occurs simultaneously with movement, will attenuate leaching, although this is rarely studied as a simultaneous process (*1–4*). Other important factors affecting pesticide movement are adsorption, net water infiltration, flow rate, diffusion and dispersion, and pesticide solubility (*5–7*). Adsorption is perhaps the dominant factor. Increased pesticide adsorption has been correlated with reduced leaching (*6*).

No laboratory study can, in itself, absolutely predict leaching; however, laboratory leaching tests should provide a quantitative or semiquantitative index of the *inherent mobility* of pesticides within the soil.

Basic Laboratory Techniques. The two basic techniques for direct leaching measurement are soil TLC and soil columns.

Soil TLC. Soil thin-layer chromatography As with soil columns, it has a fundamental analogy in conventional chromatography. Unlike columns, however, extensive basic research on water movement relationships has not been conducted in soil TLC systems. Helling (*9*) has shown, however, that water moves up a soil TLC plate by unsaturated flow and that the advancing waterfront decreases in speed as a linear function of the distance squared. Both characteristics are typical of "normal" soil relationships.

Among the advantages of soil TLC are: (1) Relative simplicity, in terms of equipment and techniques; (2) good reproducibility of soil layer characteristics and pesticide mobility results; (3) direct analysis via autoradiograph, radiochromatographic scanning, or bioassay for a continuous profile of pesticide movement (when leaching has concluded); (4) ease of distinguishing both mass transfer and diffusion components; (5) small requirements in amounts of chemical and soil, and in lab space; (6) use of multiple applications of pesticides on a single TLC plate; and (7) a convenient index of quantifying pesticide leaching, the R_f value, or movement of the chemical relative to the distance infiltrated by water.

The disadvantages of soil TLC include: (1) Inability to easily control water flux; (2) less satisfactory adaption to volatile materials such as fumigants [although Nemagon ® and other diffusive compounds have been studied in a soil TLC system (*10*)]; (3) a more homogeneous soil matrix than occurs in nature [although disturbed soil columns, as used in virtually all laboratory tests for leaching also differ from nature, as shown by movement of inorganic solutes (*11*)]; and (4) less satisfactory adaption to long-term leaching/incubation experiments (largely because pesticide diffusion often becomes quite significant in the relatively small leached zone).

Movement in soil TLC is usually measured as the frontal R_f of a spot or streak, with the R_f value shown to be independent of sample size (*9*). For comparison of mobility, a scheme of 5 mobility classes based on R_f in a standard soil, Hagerstown silty clay loam, was proposed (*8*), as shown in Table 1.

TABLE 1.—*Pesticide mobility classification for soil TLC plates*

[From: reference 8]

	Class				
	1	2	3	4	5
R_f range	0 to 0.09	0.10 to 0.34	0.35 to 0.64	0.65 to 0.89	0.90 to 1:
Description	Immobile	Low	Intermediate	Mobile	Very mobile.

This mobility classification does suffer the disadvantage of being linked to one specific soil; however, classifying a pesticide in this scheme *based on the soil being tested* should qualitatively indicate leaching behavior in that soil.

There is a trend toward the modeling of pestcide transport in the environment. The input related to leaching may be presented in part either by adsorption data, such as Freundlich constants, or by laboratory leaching data. If relationships between soil TLC R_f values and classical adsorption constants become sufficiently well defined (*8, 10, 12–15*), either source may be useful in the predictions. It appears that soil TLC data should reflect more factors affecting leaching than adsorption, and therefore may be a better model input. Presently, soil TLC data are simpler to acquire than complete adsorption data.

Soil Columns—Some of the specific advantages of soil column experiments include: (1) Previous, widespread use (a questionable advantage, given the variation in technique); (2) flexibility in design (again, not always advantageous from the standpoint of standardizing results); (3) ease of studying soil water relationships; (4) wide choice of application method, amount and formulation of applied pesticide, and method of analysis; (5) adaptability for use with volatile pesticides; (6) the possibility of using intact soil cores (very rarely done); and (7) the ability to maintain an experiment over a long time-span, if desirable.

Disadvantages of columns include: (1) Difficulty of standardizing column packing and other techniques; (2) some awkwardness in recovering the column soil for subsequent analysis after leaching (the use of segmented columns does facilitate this, however); (3) inherent discontinuous analysis of both effluent and column; (4) the potentially large amounts of soil and chemical required; (5) the large laboratory space required for extensive testing; (6) the inability (normally) of replicating or running several compounds on one column during one run; and (7) lack of an accepted "yardstick" for quantitatively reporting leaching data.

Protocol for Soil TLC Study. The recommended protocol is based on the use of soil TLC, i.e., leaching of pesticides applied to thin soil layers by an ascending chromatographic technique. A brief supplemental discussion of soil column methods follows the soil TLC protocol.

Soils. Use a minimum of 4, encompassing a range of soil organic matter contents and textural characteristics, for example, sand (agricultural), sandy loam, silt loam, and clay or clay loam. Organic matter content in at least one of the light textured soils should not exceed 1 percent. Soil *pH* may range from 4.5 to 7.5. If the pesticide is acidic or if application to alkaline soils is anticipated, at least one soil should be greater than or equal to *pH* 7.0. If anticipated pesticide use warrants, a muck should also be tested.

If reference soils become available, these should be used. In their absence, soils from regions of major pesticide use are reasonable choices. Soils available for field plot testing would be logical sources.

Apparatus. Standard thin-layer chromatography apparatus is preferable, including 20 x 20 cm glass plates, spreader (preferably variable thickness), chromatographic developing tank, etc. A satisfactory variation is the Gelman® chromatography apparatus in which soil plates are developed horizontally using a filter-paper wick. Since pesticide location is conveniently determined by use of radioisotopes, either no-screen medical X-ray film or a TLC radioactivity scanner is advisable.

Method. Additional descriptions of the soil TLC method appear in the references (*8, 9, 10, 14*).

1. *Soil preparation*. Soils are prepared by sieving to remove stones, coarser sand fractions, and large plant fragments. If crushing or grinding is involved, this step should reduce soil aggregate size but not create more fine particles (silt and clay) than originally present. Soils that are classified as sand, loamy sand, sandy loam, sandy clay loam, or sandy clay should be sieved at less than 500 μm. In general, this includes soil containing more than 50 percent sand. Finer textured soils (loam, silt loam, silty clay, etc.) should be sieved at less than 250 μm. This removes the coarse (500–2,000 μm) and medium (250–500 μm) sand fractions. Earlier testing has shown that removal of a portion of the sand did not affect pesticide mobility but did aid in achieving a more uniform soil layer. In reporting data, specify the size sieve used. Also, soil characteristics (soil clay and organic carbon contents, soil *pH*, field moisture capacity, and perhaps other properties) should be reported, specifying whether the analyses were made on whole soil or that sieved at, for example, 250 μm.

2. *Plate preparation*. Water is added to a sieved soil until a smooth, moderately fluid slurry is attained. Application of the soil slurry to clean glass plates should be done quickly enough to prevent particle size segregation. This is more likely to occur in coarse textured soils than in finer ("heavier") soils. In soils where the proportion of coarser sand is high, soil TLC plates may be more satisfactorily prepared by smoothing a direct application of soil with a glass rod. Layer thickness can be controlled, in this case, by affixing multiple layers of masking tape along the plate edges. Soil layer thickness should be 500–750 μm for soils sieved at less than 250 μm and 750–1000 μm *for* soils sieved at less than 500 μm. If a bioassay method for spot detection is employed, layer thickness should be 1000 μm to resist soil drying. Plates are air-dried before use.

3. *Pesticide application*. At least 4 soil TLC plates should be used per soil for replicating results. Soil plates in which the layer thickness varies within the zone of leaching should be discarded because water movement may be irregular and pesticide leaching patterns distorted. Application of "reference" chemical standards in addition to the pesticide(*s*) being tested is strongly advised to afford relative comparisons of mobility with other pesticides whose laboratory and field behavior (usually on other soils) is already known. Reference chemicals should include at least one mobile ($R_f \geq 0.65$ in a medium textured soil) and one less mobile (R_f 0.10–0.64) compound. Extensive lists of relative pesticide mobilities have been published (*10, 16*); relatively mobile compounds are in classes 4 and 5, less mobile compounds are in 2 and 3. In addition to the parent pesticide and reference compounds, significant degradation products should also be tested for leaching. Since 20 x 20 cm soil TLC plates can accomodate up to 7 or 8 individual applications, when visualization is by autoradiography, it is normally convenient to run all compounds (pesticide, metabolities, and reference chemicals) on each plate. Application rates on soil TLC are not directly comparable to field rates, but should be kept as low as practical, for example, 1 μg. "Aged" soil, i.e., pesticide-treated soil incubated previously as part of the aerobic metabolism test, can be extracted; extracts can then be tested directly for the presence of mobile components.

4. *Plate development*. A horizontal line is scribed through the soil layer 11.5 cm above the base. By spotting pesticides at 1.5 cm, the compounds are then leached 10 cm. Plates are immersed with the base in approximately 0.5 cm water in a closed chromatographic chamber and removed when water has risen to the scribed line. When compounds known to photodegrade are used, the leaching should be conducted in darkness.

5. *Pesticide visualization*. Soil TLC plates are then air-dried, unless volatile compounds are present. In this case, plates can be frozen immediately after leaching to reduce loss of the pesticide. If radioactive compounds are used, spot movement is determined from radioautograms made by direct exposure to no-screen medical x-ray film exposed for at least three days. Alternative methods, such as chromatographic scanning or scraping segments from the chromatogram and determining radioactivity through scintillation counting, may be necessary. Bioassay or chromogenic reagent methods of pesticide visualization on soil TLC are available (*17–20*), but are less satisfactory.

6. *Data presentation*. For each soil, mobility data is reported as the average frontal R_f (± standard deviation) of a spot or streak; i.e., if a compound moves 5.5 cm, its R_f is 0.55. The R_f of relatively immobile compounds should be corrected for the initial spot radius. Center R_f (the usual measurement for conventional TLC) may additionally be reported for compounds leaching as spots, but must be clearly distinguished from frontal R_f.

7. *Data documentation*. In addition to R_f data, a representative photograph or diagram of the leaching patterns for each soil should be submitted.

Protocol for Soil Column Study. Examples of many variations in soil column technique appear in an earlier review (*6*). Since it is not feasible to reproduce the complexities of the field in the laboratory, the techniques used in column leaching experiments should be sufficiently simple and standardized to afford reproducible relative mobility data for pesticides in a variety of soils. As with soil TLC, soil column-derived values must eventually be calibrated against the "real world" experience of field data.

Soils. Use the same selection criteria described for the soil TLC protocol.

Apparatus. Since analysis of column experiments should involve the soil itself, as well as percolate fractions, the use of a segmented column (glass or metal) is convenient. Plastic materials should be avoided unless prior testing has shown that the pesticide (and its metabolites) are not significantly adsorbed on the column walls and that plasticizers eluting from the column do not interfere with analyses.

In one protocol (*21*), segmented columns are filled to a height of 30 cm with air-dried soil. Each segment is 2 cm long x 4 cm inner diameter, permitting rather discrete analysis of the pesticide distribution. Besides 15 shorter pieces, the column also has one 10-cm section. The soil surface is usually covered after pesticide addition, with a disc of glass-fiber filter paper, sintered glass, or glass wool to minimize disturbance of the soil and uniformly distribute water applied during leaching.

Another modification of this apparatus, Harris' (*22, 23*) use of stacked aluminum rings, 2.5 cm x 7.6 cm (I.D.), was used to evaluate comparative mobilities of 28 herbicides (*22*) and 11 insecticides (*23*). The soil column length was 18 cm. The use of longitudinally slotted (*24*) or split columns have been convenient for bioassaying columns *in situ* after leaching.

Additional descriptions of soil column leaching apparatus appear elsewhere (*25*). A major precaution in the preparation of columns is the necessity of uniform packing. A known weight of 2-mm-sieved, air-dried soil is added slowly, for example, with column vibration. Bulk density should be measured and reported and should be nearly the same for all columns of the same soil.

Method. The parent pesticide, major metabolite(s), or previously aged (via the aerobic metabolism study) radioactive pesticide is added uniformly via treated soil, or in a minimum amount of solvent, to the top of the air-dry soil column. The amount of parent added should correspond to the highest recommended rate for a single application. Although a greater effluent volume will obviously be collected if the soil column is initially at field capacity, tests have shown (*26*) that penetration depth of several herbicides was the same in dry as in moist soil columns. With the appropriate filter pad in place, water or 0.01 *N* $CaSO_4$ is added at a rate which does not exceed the infiltration capacity of the soil.

Sufficient 0.01 *N* $CaSO_4$ solution should be added to achieve at least one column volume of effluent. (Specify the amount used and the period over which leaching occurs.) It is anticipated that by leaching a 30-cm soil column with 20 cm of solution, 1 to 3 column volumes of water effluent will elute from the column. Since this amount depends on the moisture retention characteristics of the packed column, the ⅓-bar moisture content and the volume of effluent collected (after drainage has stopped) should be reported.

Reports of leaching tests should be accompanied by data on at least one reference chemical with mobility characteristics similar to the parent pesticide under examination. Evaluation of leaching results would be enhanced, however, if reference chemicals showing significantly greater and less mobility are also included.

Leaching data should include analysis of effluent fractions and the soil itself. In a 30-cm column, individual segments should be approximately 5 cm each. At least 3 replicate columns should be run per test. If tests on aged soil have demonstrated a mobile constituent, efforts should be made toward its chemical identification.

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FIELD LEACHING STUDIES

Reviews of pesticide dissipation from soils published in recent years have referred to the leaching of pesticides as measured in the field (*1–3*). Leaching of pesticides implies the displacement of the chemical in the soil by water. About the only measure of pesticide leaching that many field studies provide is the depth of penetration as measured by soil sampling. Usually the dissipation of pesticides from soils includes the processes of volatilization, degradation and all its ramifications, and photolysis as well as leaching. Consequently, depth of penetration studies provide very little information concerning the displacement of chemicals by leaching relative to other modes of dissipation. Nor do they provide measurements of water contents of the soil profiles, the flux of water, rainfall, applied water, etc., that are necessary to quantity the displacement process.

Intermittent sampling of soil profiles to assess the time and spatial displacement of a chemical is often used as a measure of leaching patterns. Usually such measurements assume that any leaching that has occurred in the interval will be manifested by adsorbed pesticide at the depth of interest. If the chemical is absent, the assumption is made that penetration to that depth has not occurred.

A logical question to be asked before adopting a specific protocol for leaching investigations is whether the leaching experiment should be conducted for those conditions under which the pesticide is normally used, or whether the investigation should be designed to examine whether the pesticide can be leached.

Adopting the former argument involves a definition of what "normal" conditions are and, therefore, leaves open the questions which are usually never characterized; i.e., what were the actual conditions and how are these interpreted in terms of the broad range of conditions that might occur. Further, other processes that may also account for the dissipation of the pesticide, such as water content of the profile, temperature, rainfall, etc., confound the relation between the amount of chemical applied and the depth of penetration.

In contrast, leaching investigations can be designed to examine the leaching characteristics of the chemical under conditions which are not usually considered normal, but reasonable. Such conditions could be more adequately characterized and the behavior of the chemical more adequately interpreted in terms of other processes that contribute to its dissipation (for example, any process which reduces the concentration that could exist in a mobile form).

A review of the literature suggests a protocol should be developed which adopts the latter viewpoint. Clearly, some procedure should be adopted which improves on procedures currently described and followed by most investigators. If such improvements are not made, the evaluation of pesticide leaching will continue in a haphazard manner and the application of theoretical analysis will not materialize.

Protocol for Field Leaching Studies. The protocol outlined below could be used for field leaching tests should such tests be deemed advisable. It is presented as a guide although modifications could be made where conditions suggest such modifications would be desirable.

I. *Location*. The test locations could be selected according to the requirement of the pesticide use.

II. *Time Period*. The tests should be initiated when the pesticide is normally applied. Since the purpose of the test is to examine leaching characteristics, a short period of intensive monitoring is suggested to examine the leaching characteristics immediately after application before other dissipative processes become dominant; i.e., a period of 1 to 2 wk. Less frequent monitoring for longer periods of time would yield information on field dissipation which might include other processes, such as degradation, that become more dominant with time.

III. *Experimental Design*. A. Three types of treatments are being suggested for comparative purposes. However, the difference between the 3 treatments is such that for short-term experiments only one—where excessive water and a pesticide application rate larger than the normal rate is used—may be meaningful. Two plots in each treatment are suggested to provide some assurance that should unusual conditions exist either in the conduct of the test or the soil, the test will not be lost.

1. Excessive irrigation—3x pesticide. Two plots which receive high pesticide application rates and excessive water for the spe-

cific purpose of testing the tendency of the pesticide to leach.

2. Normal irrigation—rainfall—1x pesticide. Two plots which receive recommended rates of pesticide use and water applications based on normal yearly rainfall amounts or where irrigation is practiced (and rainfall is low).

3. *Normal rainfall—3x pesticide.* Two plots which receive only normal rainfall (for areas where no irrigation is practiced). This treatment is more in the nature of a field dissipation study and is included only for comparative purposes.

B. The area selected should be level and free of vegetation. The soil surface should be lightly tilled before application of the pesticide. Following application of the pesticide, the chemical should be tilled into the upper 4 in. of soil and mixed as thoroughly as possible. A rototiller can be used for this.

C. The form in which the pesticide is applied would be determined by the formulation. Uniformity of application is important and can best be achieved either by spraying on a pesticide soution or by uniformly spreading a dry mixture. In some cases, the pesticide could be mixed in a large volume of water outside the plot and applied as the first irrigation to the plot. This procedure has been successfully accomplished by mixing the chemical with water in a plastic swimming pool set up outside the plot and pumping the mixture to the plot. The volume of water used was based on the volume of water that would cover the test plot to a depth of 2, 3, or 4 in.

D. Recommended application rates.

1. On the heavily irrigated plots the recommended rates would be 3x the recommended rate.

2. On the plots where irrigation is used to simulate normal rainfall or where irrigation is the sole main source of water, the recommended rate is 1x.

3. On normal rainfall plots the recommended pesticide rate is 3x.

E. The plot size is not crucial except that a larger area minimizes the effect of lateral flow in the region of instrumentation and provides a larger sampling area for repeated sampling. It also reduces the effect of unusual soil variability. An area 7 m sq (or 20 ft sq) has been found useful. The plot is surrounded by an artificial barrier, such as planking (1 in. x 12 in.) which is sunk into the soil surface 6 to 8 in., back filled on both sides, and tamped to prevent the escape of water from within the plot. This design is used so that water may be ponded on the surface. However, a good sprinkling system, capable of applying the water uniformly, could also be used in lieu of the barrier. In this case, a low soil berm may be used to contain any water which might run off. Plots should be separated by 3 or more meters.

IV. *Instrumentation.* All instruments in the 7 m sq plot should be located in an area 3 m x 3 m.

A. *Suction probes.* Soil solution is obtained during the leaching process by means of suction probes. Three probes at each depth are suggested to provide sufficient solution for analysis and to overcome some of the variable leaching characteristics of the profile. A minimum of 2 probes should be installed.

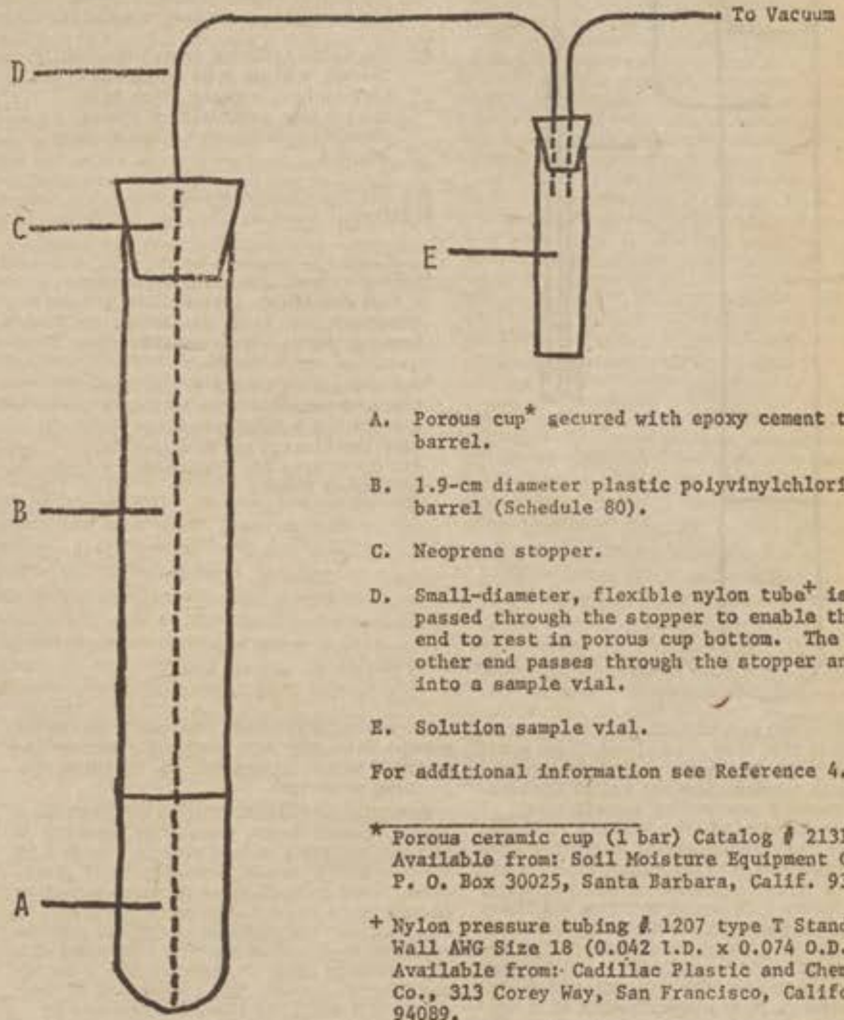
To examine the movement of the pesticide, should it occur, the probes should be installed at 15, 30, 60, 90, and 180 cm. In soils where shallow water tables are a problem, the spacing at the deeper depths could be eliminated or compressed. Good installation procedures suggest that an ordinary wood bit of the same diameter as the suction cup be used to make the hole for the suction probe. The bit is welded to a rod for ease of boring.

The suction probe can be constructed from PVC tubing (Schedule 40) to which the ceramic cup is glued. (See Figure 1.) Should the PVC tubing be deemed undesirable, copper tubing has been used. However, in general the soil solution does not come in contact with the PVC tubing which merely acts as a holder of the cup, and the PVC is easier to work with and less expensive. The ceramic cups are available from commercial suppliers and should be washed with a solution of dilute HCl several times and washed with distilled water before use.

The probes should be installed when the soil is moist and easy to work. Once the probe is in place, the soil should be tamped firmly around the barrel to a depth of 6 in. to prevent channeling.

After the probe has been installed a tube of small bore (⅛ in. to 1/16 in. in diameter) and of sufficient length to extend from the bottom of the ceramic cup to the edge of the plot, is inserted. The insertion takes place through a rubber stopper which seals the top of the probe. If nylon or other plastic tubing is undesirable, ⅛-in. O.D. copper tubing can be used.

At the edge of the plot the tubing enters a collection receptacle through the stopper. Passing through this same stopper is another tube of ¼-in. diameter which is connected to a vacuum source of 0.3 atm. Usually a manifold can be constructed to supply vacuum to all the probes in a plot. Glass vials of various sizes fitted with screw caps lined with foil have been used successfully. Liquid scintillation vials of 30-50 ml capacity are quite satisfactory.



A. Porous cup* secured with epoxy cement to barrel.

B. 1.9-cm diameter plastic polyvinylchlorida barrel (Schedule 80).

C. Neoprene stopper.

D. Small-diameter, flexible nylon tube+ is passed through the stopper to enable the end to rest in porous cup bottom. The other end passes through the stopper and into a sample vial.

E. Solution sample vial.

For additional information see Reference 4.

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* Porous ceramic cup (1 bar) Catalog # 2131 Available from: Soil Moisture Equipment Co., P. O. Box 30025, Santa Barbara, Calif. 93105.

+ Nylon pressure tubing # 1207 type T Standard Wall AWG Size 18 (0.042 I.D. x 0.074 O.D.) Available from: Cadillac Plastic and Chemical Co., 313 Corey Way, San Francisco, California 94089.

Figure 1. Soil-Water Solution Probe Construction.

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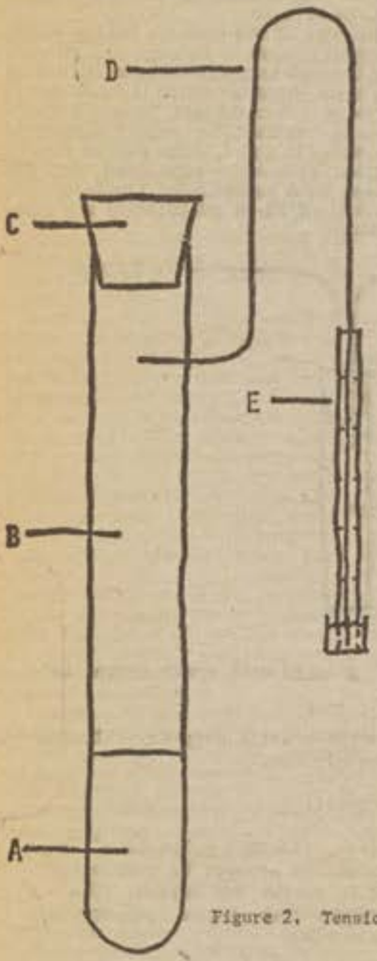
The suction probes need not protrude above the soil surface if they can be tightly sealed so that water cannot enter the barrel. A good general rule is that if they are to be buried, the top of the barrel should be below the saturated soil zone in order to prevent leakage into the barrel should a slight leak develop at the stopper. For this reason, it is usually safer to have them protrude above the soil surface at least 15 cm so that water that is ponded on the surface does not cover the stopper. They are also easier to service should it be necessary. On the other hand, when they protrude above ground surface, maintenance of the plot, viz-a-viz growth of plants, must be done manually.

B. Tensiometers. The tensiometers can be constructed in exactly the same manner as the suction probes except that a clear piece of lucite or glass should be glued to the top of the pipe to provide visual inspection for air leaks. If the tensiometers are buried, this features can be eliminated. A small bore nylon tube is attached to the PVC tube to provide a water connection between the PVC tube and the mercury manometer at the edge of the plot. Commercial tensiometers using gauges may be used in place of the nylon tubing and mercury manometer. Since the main purpose of the tensiometers is to provide an indication of the moisture status of the profile, the latter may prove more convenient although more expensive. If the tensiometer is below ground surface, 2 nylon tubes will be required. (See Figure 2.)



A. Porous cup[*] secured with epoxy cement to barrel.

B. 1.9-cm diameter plastic polyvinylchloride barrel (Schedule 80).

C. Neoprene stopper.

D. Small-diameter, flexible, water-filled nylon tube[†] epoxied to PVC barrel connects the water in the barrel to a mercury reservior.

E. The nylon tube was passed vertically through a glass tube which was affixed atop a meter stick into the mercury reservoir, allowing convenient readings of the mercury length.

For additional information see References 5 and 6.

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[*] Porous ceramic cup (1 bar) Catalog # 2131 Available from: Soil Moisture Equipment Co., P. O. Box 30025, Santa Barbara, Calif. 93105.

[†] Nylon pressure tubing # 1207 type T Standard Wall AWG Size 18 (0.042 I.D. x 0.074 O.D.) Available from: Cadillac Plastic and Chemical Co., 313 Corey Way, San Francisco, California 94089.

Figure 2. Tensiometer Construction.

App. VI-45

Tensiometers and suction probes should be installed so that they are at least 30 cm apart and staggered in depth so that adjacent probes and tensiometers are not at the same depth, thereby preventing interference.

One tensiometer at each depth is sufficient although 2 are recommended to preclude loss of information due to instrument failure and provide a better estimate of the soil water suction. Since it is useful to know the direction of the gradient for water flow in the profile, at least 2 depths of installation are required. Since the shallower depths are likely to undergo wider fluctuations in soil water suction, it is recommended that tensiometers be placed at the same depths as the suction probes.

V. *Test Procedure*. A. Before application of the compound, the plots should be flooded with water to a depth of 6 cm and maintained in this condition to wet the profile. This will provide a period in which to close leaks and test the instruments. At the end of this period the plots should be allowed to drain until the surface is dry enough to work.

B. *Excessive irrigation plots*. 1. To minimize the short-term leaching period, a continuous leaching procedure is recommended. Following the application of the pesticide, water is continuously ponded on the plot until 30 in. of water has entered the profile. If the pesticide is applied in the first irrigation water increment, the pesticide water should enter the soil completely before additional water is applied to continue the leaching procedure.

Sampling of the soil solution at the shallow depths should begin soon after leaching is started. Sampling should continue every 2 hr for the first 8 hr and less frequently thereafter. Some indication as to when sampling should begin at each successive depth can be ascertained from changes in the soil suction readings on the tensiometers. When the suction readings begin to decrease, this is an indication that water has penetrated to that depth and sampling should commence.

After all water has entered the plot and redistribution begins in the soil profile, occasional sampling for 2 to 3 days would provide information on pesticide movement under unsaturated conditions. When the soil profile is sufficiently dry, but still moist, soil samples could be taken as a final check on the pattern of pesticide distribution.

2. As an alternative to the above procedure, the leaching water could be applied in increments of an equivalent depth of 4 in. on the soil surface with approximately 3-5 days of redistribution between increments. This procedure might be more convenient for some investigators. Some modification in the sampling procedure might be followed although, in general, it would be much the same as that described.

C. *Normal irrigation plots*. The same procedures as above would apply to the normal irrigation or simulated rainfall treatment.

D. *Normal rainfall plots*. Normal rainfall treatments would require that sampling of the soil solution would be possible only when sufficient rainfall occurred to wet the soil profile. This treatment could logically be eliminated from a strictly leaching investigation since the time-span is such that much of the pesticide would disappear through other processes. Since rainfall is likely to be intermittent, depth of penetration could be measured by soil sampling and suction probes could be eliminated.

E. *Temperature*. 1. Temperature devices to allow continuous monitoring of the soil temperature at 15 cm and 45 cm should be installed. The temperature measurement should be made in one plot of normal rainfall and one plot of applied water. Inexpensive clock-driven thermographs are suitable for this purpose.

2. Meteorological measurements, such as air temperature and rainfall, should also be obtained in the vicinity of the test area.

F. *Specific comments*. The purposes of specifying 2 types of test leaching procedures are as follows:

1. Normal rainfall will provide information on the depth of penetration for areas where rainfall is the only source of water. Montoring of the soil solution by suction probes provides a measure of the penetration during the flow process, a condition which intermittent soil sampling will not provide, particularly when soils are too wet to sample otherwise.

2. The time factor following application will provide a comparison with the treatment involving immediate leaching.

3. The applied water treatment provides a measure of the immediate leachability of the chemical under sustained water applications. This treatment is extreme, but it provides the limit of the chemical's mobility. The 2 tests therefore provide broad limits between which the normal use and environmental conditions are likely to occur. Should the chemical move excessively under the applied water treatment, then other factors affecting the degradation of the compound and lesser leaching conditions can be considered in evaluating the actual leaching that is likely to occur under "normal" conditions. The condition of a moist profile and intermittent water application provides a favorable test condition for compounds that are either less prone to move or more prone to move depending upon the soil moisture conditions. Also the mechanics of performing the test are easier to execute.

4. The initial pesticide application is higher than normal use but not excessive. Considering other modes of dissipation, repeated applications of some chemicals and so forth, this represents a compromise in the test procedure.

5. Temperature and rainfall data are useful since these 2 factors appear to be important variables in the dissipation of pesticides in the environment.

6. Both soil solution (probe) and soil samples are included in the requirement: the former to assess the mobility; the latter to provide data that may not be evident from solution sampling.

7. A chloride salt such as KCl at the rate of 2 tons/acre could be uniformly spread on the plot surface in a dry powder form at at the time the pesticide is applied. This relatively inert tracer would provide a measure of the depth that a mobile constituent will penetrate under natural rainfall as well as under applied water conditions and a useful comparison with the less mobile pesticides.

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VOLATILIZATION STUDIES

Pesticides may be lost from treated areas by volatilization. The rate at which a substance passes from the solid phase to the vapor phase depends on a number of factors. Under environmental conditions, the effects of particle size, climate, interactions with environmental substrates or with other ingredients of the formulation must all be considered insofar as they modify the rate of loss of the pure material from a surface when the molecules diffuse through still air layers.

Vapor pressure is one of the most important factors governing the tendency of a compound to volatilize; it provides an indication of the relative tendency of pure substances to vaporize in an unperturbed situation. The rate of evaporation of a number of compounds is related to the vapor pressure p, by the relationship:

$$p = k\ (\text{evaporation rate})^{n} \qquad (1)$$

where k and n are parameters that depend on such factors as temperature and wind speed (*1*). Other factors influencing volatility have recently been discussed by Phillips (*2*). Field studies have indicated that the best indication of the extent of volatilization of a pesticide from soil may be gained by measurements of the instantaneous flux of water vapor over the field (*3*).

Volatilization from aqueous systems depends not only on the vapor pressure of the compound but also on its solubility. The problem is complicated in soils since adsorption occurs. However, quantitative estimates of relative volatility can be obtained from the measurement of vapor pressure, water solubility and soil adsorption.

Elaborate laboratory or field experiments are of questionable value at the present time, since techniques of measurement of volatilization rates in the field are not sufficiently developed for critical or comparative evaluation. However, it seems reasonable that careful measurements of the basic data should provide a rational basis for the assessment of environmental hazard.

Vapor Pressure Measurement—Methods. Several methods have been described in the literature for measurement of vapor pressure (*4–6*). The methods for measuring the vapor pressure of pesticides should generally be applicable to the measurement of pressures less than 10^{-3} mm in the vicinity of 25°C. Methods based on extrapolation from measurements at elevated temperatures give unreliable results, especially if the curve is extrapolated through a temperature at which a change of phase occurs.

Two principal methods are available. The first is the Knudsen effusion method described by Hamaker (*5*) in which the rate of loss of a vapor escaping through a hole of known diameter is measured. Alternatively, the jet recoil from the stream of effusing gas may be measured by a torsion balance. The second method, originally due to Regnault, is often termed the transpiration method (*6*). A stream of gas is saturated with a vapor and the vapor is collected by trapping. Measurement of the amount of material transported by a known amount of carrier gas is used to calculate the vapor pressure. This method was developed by Spencer and his coworkers (*7–9*) and used to measure vapor pressure of a number of pesticides. The changes in vapor pressure caused by adsorption on soil were also studied (*10*). The principal advantage of the latter method over the effusion method is primarily that the presence of impurities does not affect the accuracy of the results, if the method of analysis is specific for the compound under study. In both methods it is essential that the gas be saturated with vapor.

Comparison of results in the literature shows a wide range of values given for a number of individual pesticides. These vary with the technique used. It is therefore important to make an initial check of the performance of the apparatus by the use of compounds of known vapor pressure.

Estimates of Relative Volatility—Evaporation of a pesticide is probably proportional to the evaporation of water from a field. This concept was proposed by Hartley (*11*) and is based on the assumptions that the mechanisms (diffusion, convection, etc.) promoting the volatilization of water will influence other compounds equally and that the rate of volatilization of other compounds, like that of water, will be controlled by environmental factors.

The first factor is that the vapor pressure (or vapor density) of the compound will govern the amount of vapor present in the system. A second factor is the rate of diffusion of the compound through the air, which will be approximately proportional to the square root of the molecpular weight. The third factor is the weight of material carried by the diffusing molescular, which is directly proportional to the molecular weight, *M*. Equation 2 combines these factors:

$$\frac{\text{Wgt. evap. (pest.)}}{\text{Wgt. evap. }(H_2O)} = \frac{(pM^{1/2})\ \text{pest.}}{(pM^{1/2})\ H_2O} \qquad (2)$$

Hartley's calculations based on a water loss of 6 tons water/acre/day gave, for the weight of pesticide evaporated in pounds/acre/day (W), the formula:

$$W = 322.6\ (pM^{1/2})\ \text{pest.} \qquad (3)$$

This formula is approximate and does not take into account the adsorption on soils, but it is useful for the comparison of the volatility of one pesticide with another. Such calculations give a guide to pesticide behavior; for example, DDT is estimated to volatilize at the rate of 0.4 lb/acre/yr, whereas parathion would volatilize at 0.21 lb/acre/day at application rates of 0.25 to 0.5 lb/acre. However, many factors, such as adsorption, interaction with other compounds, and distribution, reduce the rate of volatilization significantly. Caution is necessary in using such predictions.

The comparison of pesticide behavior based on vapor pressure measurements may be extended to yield estimates of volatility from water or volatility from moist soil. In the former case the solubility in water is required and in the latter, the adsorption coefficient is necessary for the calculation.

Volatility—From Water. The use of water solubility to calculate volatility from water solution depends on the observation that the saturated solution should have the same vapor pressure as the pure chemical. Thus, the vapor pressure of the chemical can be used to calculate the ratio between the concentration in water and that in the air. The following formula (*12*) can be used:

$$\frac{C_{H_2O}}{C_{air}} = \frac{\text{Solubility} \times 82.06 \times 760 \times T}{pM \times 10^{6}} \qquad (4)$$

where C_{H_2O} is the pesticide concentration in water (ppm); C_{air} is the pesticide concentration in air (µg/cc); 82.06 = gas constant (cc atm/deg·mol); 760 = mm/atm; T = absolute temperature, °K (i.e., °C + 273.15); p is the vapor pressure; and M is the molecular weight of the compound. Pesticide solubility is reported as ppm. This formula may not be exact, since the vapor pressure of the pure chemical may be changed because of water that dissolves in the chemical. Also, there may be some change in distribution ratio as the concentration of chemical decreases from its saturation value. However, inaccuracies are very small since most pesticides have low water solubility and, hence, a very small affinity for water.

This calculation as applied to a group of pesticides is shown as Table 1. The chemicals are listed in order of increasing value for the calculated distribution ratios, which, as the last column indicates, is qualitatively consistent with volatility from aqueous sys-

TABLE 1.—*Estimates of volatility of chemicals from water*

[From: references 12 to 15]

Chemical	Vapor pressure [a] (millimeters per hectogram)	Water solubility [a] (parts per million)	Distribution ratio water/air (parts per million or micrograms per cubic centimeter)	Estimated practical volatility behavior from aqueous systems
Methyl bromide	1.34×10^{3}	16,000	2.30	Very volatile fumigant.
Chloropicrin	2×10^{1}	1,950	11	Volatile fumigant.
Ethylene dibromide	$.77\times10^{1}$	3,370	43.3	Do.
Dibromochloropropane	5.8×10^{-1}	1,230	164	Fumigant.
Trifluralin	[b] 1×10^{-4}	[b] .58	322	Significant volatility.
DDT	1.9×10^{-7}	.0012	326	Volatile from water.
Nitrapyrin [c]	2.8×10^{-3}	[b] 40	1,150	Volatile if surface-applied to moist soil.
EPTC	[b] 1.97×10^{-2}	370	1,844	Do.
Lindane	3.2×10^{-5}	10	2×10^{4}	Slight volatility.
Parathion	3.8×10^{-5}	20	3.36×10^{4}	Volatile from leaf surfaces.
Chloropham	1×10^{-5}	88	8×10^{5}	Low volatility.
Atrazine	8.9×10^{-7}	33	3.2×10^{6}	Nonvolatile.
Phenylmercuric acetate	9×10^{-6}	4,700	2.88×10^{7}	Do.
Monuron	5×10^{-7}	230	4.3×10^{7}	Do.

[a] Vapor pressure and water solubility at the same temperature, usually 25° C.

[b] Measurements made at the Walnut Creek Laboratory of the Dow Chemical Co.

[c] Nitrapyrin is 2-chloro-6-(trichloromethyl) pyridine.

tems. The following rating system is suggested:

<100—Rapidly lost from water surfaces. If soil adsorption is low, can act like a fumigant, i.e., moves as vapor through moist soil.
10^2–10^4—Volatile from water surface.
10^4–10^6—Slight volatility from water surface.
>10^6—Nonvolatile.

Note that the vapor pressures themselves do not form a sequence, and that DDT is the most out of line. Because of its very low solubility, it is much more volatile from water than its vapor pressure would suggest. In such cases co-distillation may also affect the loss.

From Moist Soil. Volatilization from a moist soil surface is volatilization from water modified by soil adsorption. Adsorption will diminish the tendency of the chemical to volatilize. The distribution ratio between wet soil and air, if the pesticide concentration is on a dry soil-weight basis, can be calculated (*12*) by Equation 5.

$$\frac{C_{ws}}{C_{air}} = C_{H_2O}/C_{air}\ (1/r + K_d) \qquad (5)$$

where C_{ws} is the pesticide concentration in wet soil (ppm, on a dry soil weight basis); C_{H_2O}/C_{air} is the water/air distribution ratio; r is the weight of soil/wt. of H_2O; and K_d is the concentration in soil/conc. in H_2O (linear adsorption coefficient).

If the soil concentration is expressed on the basis of the total weight of soil and water, the following formula (*12*) applies:

$$\frac{C_{ws}}{C_{air}} = \frac{C_{H_2O}}{C_{air}}\left(\frac{1}{r+1} + \frac{rK_d}{r+1}\right) \qquad (6)$$

The first formula (Equation 5) was applied to a number of pesticides with r assigned a value of 6 as a reasonable moisture content. The results are given in Table 2 with the pesticides arranged in order of increasing soil/air distribution ratio, corresponding to decreasing volatility. Note that adsorption significantly reduce the volatility of parathion, DDT, and EPTC. The practical significance of volatilization must clearly include consideration of degradation and leaching as alternative pathways for loss from soil.

TABLE 2.—*Estimated tendency of chemicals to volatilize from water and from moist soil*

[From: references 12 to 15]

Chemical	Vapor pressure (millimeters per hectogram)	Solubility in water (parts per million)	Water/air concentration ratio [a]	K_d for 2 percent organic carbon [b]	Water + Soil / Air concentration ratio [c]
Fumigants:					
Cis-1,3-D	2.5×10^1	2,706	17.7	0.51	1.2×10^1
Trans-1,3-D	1.85×10^1	2,800	24.9	.56	1.81×10^1
EDB	$.77\times10^1$	3,370	43.3	.65	3.54×10^1
DBCP	5.8×10^{-1}	1,230	167	2.58	4.59×10^2
Volatile from soil:					
Chloroneb	3×10^{-3}	8	2.35×10^2	23.2	5.49×10^3
EPTC	1.97×10^{-2}	370	1.84×10^3	5.66	1.07×10^4
Dichlobenil	5.5×10^{-4}	18	3.48×10^3	3.28	1.2×10^4
Slightly volatile from soil:					
Disulfoton	1.8×10^{-4}	15	5.55×10^3	42.6	2.37×10^5
Lindane	3.2×10^{-5}	10	1.96×10^4	26.8	5.29×10^5
DDT	1.9×10^{-7}	1.2×10^{-3}	3.26×10^2	4,860	1.58×10^6
Nonvolatile from soil:					
Parathion	3.8×10^{-5}	20	3.3×10^4	209	6.9×10^6
Chlorpropham	1×10^{-5}	88	8×10^5	11.8	1×10^7
Atrazine	8.9×10^{-7}	33	3.2×10^6	3.44	1.2×10^7
Monuron	5×10^{-7}	230	4.2×10^7	1.66	7.67×10^7

See equation below:

[a] $$\frac{\text{Water+soil}}{\text{air}} = \frac{C_{H_2O}}{C_{air}}\left(\frac{1}{\text{wt. (soil/water)}} + K_d\right)$$

[b] This K_d represents 0.02 (K_{oc}), i.e., the distribution coefficient corrected to a "standard" soil containing 2 percent organic carbon.

[c] Wt. (soil/water) = 6: volume (water/air) = 1.

Actual volatility from a specific soil situation will depend upon such a variety of circumstances that it will be very variable. Spencer and Cliath (*16*) have shown, for example, that the rate of volatilization depends upon the moisture conditions at the soil surface. Since the absorption on a dry soil surface is much higher than on moist soil, a surface layer of dry soil will act as a barrier to volatilization by adsorbing the chemical. It would appear that, under field conditions, volatilization from soil may occur in "bursts" after rainfall.

The observed volatility will also depend upon the depth to which the chemical is incorporated into the soil. Thus, any attempt to measure the volatility from soil directly will necessarily be arbitrary and probably will not provide much more information than an estimate of tendency to volatilize based upon the calculated (soil + water)/air concentration ratio.

Transpiration (Gas-Saturation) Method of Measuring Pesticide Vapor Pressure. Vapor pressure of pesticides, less than approximately 0.01 mm Hg, should be determined by the gas-saturation method in which an inert gas, such as nitrogen, is passed through pesticide-treated sand slowly enough to insure equilibrium vapor saturation (*8, 10, 17–19*). The pesticide can be removed from the carrier gas stream in a suitable liquid trapping agent such as hexane (*18*), ethylene glycol (*16*), or a suitable solid trapping agent, such as Florisil (*20*) or Chromosorb 102 (*21*). The pesticide content of the trapping solution or solid-phase material is then determined with a gas-liquid chromatograph or other suitable instrument for detecting low levels of pesticides.

Apparatus. The apparatus described below can be adapted for measuring vapor pressures of pesticides in various soils by incorporating a humidity control and measuring device in the flow system in order to maintain relatively constant soil-water contents during the measuring period (*18*).

1. Constant temperature, water bath or incubator.

2. The flow system should allow for (a) careful control of air flow, for example by needle valves, to flow rates of 1 ml/min; (b) careful measurement of air flow; and (c) correction of the flows due to pressure and temperature differences between the flow meter and the saturator.

3. The saturator or the volatilization tube containing the pesticide-treated sand should be sufficiently large to allow a residence time of approximately 30 min after inert gas injection to insure equilibrium vapor saturation. This would require a volatilization tube of approximately 100-ml volume at a flow rate of 3 ml/min. For this purpose a glass tube, 3-cm diameter by 15 cm long, with ground glass joints would be sufficient. Larger saturators are satisfactory.

4. The trapping system can utilize solid-phase or liquid-phase trapping agents. Solid-phase trapping agents can be connected directly to the volatilization tube through ground glass joints or Teflon tubing. Liquid trapping agents should be contained in gas-washing bottles or similar tubes containing fritted bubblers to facilitate pesticide trapping in the liquid solvent. These can be connected to the volatilization tube with Teflon tubes or ground glass joints.

Procedures. The vaporization tube saturator should be filled with white silica sand coated with the pesticide. Quantities of relatively pure pesticide, equivalent to 1–2 percent of the chemical, should be added to the white silica sand in a suitable solvent. (The white sand should be relatively free of iron and aluminum oxides; water-washing the sand by pouring off the supernatant liquid containing the fine fraction is a desirable precaution.) After evaporating the solvent in the open air or in a rotary evaporator, the sand-pesticide mixture should be mixed thoroughly and added to the vaporization tubes. For 100-ml vaporization tubes, approximately 150 g sand should be treated with the pesticide contained in 5 to 10 ml of solvent. After connecting the vapor trap and bringing the system to constant temperature, dry nitrogen gas is passed through the saturation at flow rates of about 3 to 5 ml/min until sufficient pesticide has been trapped for analysis by a suitable analytical technique—preferably by GLC. Vapor pressure should be determined at 3 temperatures (25°, 35°, and 45° C) to allow calculation of the vapor pressure-temperature coefficient, or heat of vaporization. Vapor pressure can be measured on the *same column at various temperatures* by varying the temperature in the constant temperature water bath or incubator. Several runs should be made at each temperature on the same column, preferably at more than one flow rate within a range of 3 to 8 ml/min to ensure vapor saturation.

Flow rates should be monitored to establish the total volume of gas flowing through the saturator during each run. To calculate vapor density in weight per unit volume of gas passing through the saturator, the measured volumes are corrected for pressure and temperature differences and for the net volume of trapping solvent added to the nitrogen gas between the saturator and the flow meter. These corrections are much simpler if a solid-phase adsorbent is used since it is then unnecessary to correct for the volume for the volatilized solvent. Vapor pressure is calculated from vapor density as follows:

$$p = d\ (RT/M) \qquad (7)$$

where p is vapor pressure in mm of Hg; d is vapor density in g/1; R is the molar gas constant (62.4 when pressure is in mm Hg and volume is in liters); T is the absolute temperature; and M is the molecular weight of the pesticide.

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LABORATORY SOIL METABOLISM STUDIES

Three main types of transformation are reported to occur in soil—photochemical, chemical and microbiological.

Although photodecomposition of pesticides in air and water is a very common occurrence, little photodecomposition in soil would be expected since radiant energy is strongly sorbed by soil and therefore relatively unavailable for photochemical degradation. Nonetheless, for purposes of registration, the registrant is encouraged to conduct laboratory-scale soil degradation experiments in the dark so as to eliminate photolysis as a possible significant factor in these experiments.

Chemical transformations in soil, mediated through water functioning as a reaction medium, a reactant, or both, are widespread phenomena. The chemical reactions that occur in soil may be catalyzed by clay surfaces, metal oxides, metal ions, organic surfaces, and organic materials that can be separated from the soil. Additionally, extracellular enzymes which are widely distributed and stabilized in soil, play a significant role in the degradation of many pesticides and represent the transition point between chemical and intracellular microbiological breakdown.

Microbiological degradation is a critical factor affecting the fate and behavior of pesticides in soil (*1,2*). Whether or not a chemical is persistent, short-lived, mobile, stationary, sorbed, activated, inactivated, or eventually constitutes a residue problem may depend upon its metabolism by soil microorganisms.

Comparison of autoclaved with nonsterile soils should not in itself be considered adequate criteria for substantiating microbial degradation as the sole mechanism of pesticide dissipation. Because of the unreliable effects of soil sterilization methods on pesticide behavior and product formation in soil (*3*) and their negligible value in assessing the microbial involvement in pesticide metabolism, "sterile controls" have no value in soil dissipation protocols.

Other methods of eliminating, controlling, or reducing microbiological activity should be employed to accurately assess the contribution of the soil microbial population. For purposes of registration, it would seem most expeditious to delineate the pathway(s) and rate of dissipation from soil and to identify or characterize the intermediate products involved insofar as reasonably possible. The exact mechanism (microbial versus chemical) whereby a given pesticide degrades should be considered of more academic than practical significance.

Soil dissipation studies require the use of radiolabeled pesticides and should be designed to:

1. Characterize the rate of breakdown of the parent pesticide and products so that their stability in soil can be classified and related to reference compounds.
2. Determine products and degradation pathways.
3. Develop some concept of variability in breakdown rate as related to soil and climatic factors.
4. Determine the influence of soil and climatic factors on accumulation of different soil products.
5. Maintain a balance sheet of radioactivity applied to the experimental sample.

Protocol for Aerobic Soil Dissipation Studies—Incubation System. Two types of systems (1 open and 1 closed) can be recommended. Each has its inherent advantages and disadvantages. An open system employing a multipurpose manifold assembly has been described by Parr and Smith (*4*) for use in evaluating microbiological interactions with pesticides. (See Figure 1.) The principal advantage of the system is that the investigator can conduct soil respiration experiments under more precisely defined conditions; i.e., a relatively constant level of oxygen can be maintained in the decomposition chambers throughout incubation and the effect of different gaseous environments (involving mixtures of oxygen, nitrogen, and carbon dioxide) on soil microbial activity can be studied. Traps can also be incorporated for volatile products. An obvious drawback of this system is its complexity for large multiflask experiments.

The "biometer" flask approach (closed system) of Bartha and Pramer (*5*) has received wide usage in pesticide soil dissipation studies. Other closed systems containing the basic elements illustrated in Figure 2 may be equally acceptable. Inclusion of a pure oxygen inlet in this system allows the replenishment of oxygen used by the soil on a one-to-one basis. If air is substituted for oxygen, the flask atmosphere becomes progressively enriched in nitrogen and less in oxygen, thus ultimately creating more nearly anaerobic conditions.

Soil—Soil dried to a workable moisture content should be screened through a 2-mm screen before weighing into incubation flasks. An adequate ratio of head space versus soil volume should be maintained. Fifty g of soil appear adequate for 250-ml biometer flasks. Moisture content should be determined so that samples can be adjusted to correct moisture level after treatment.

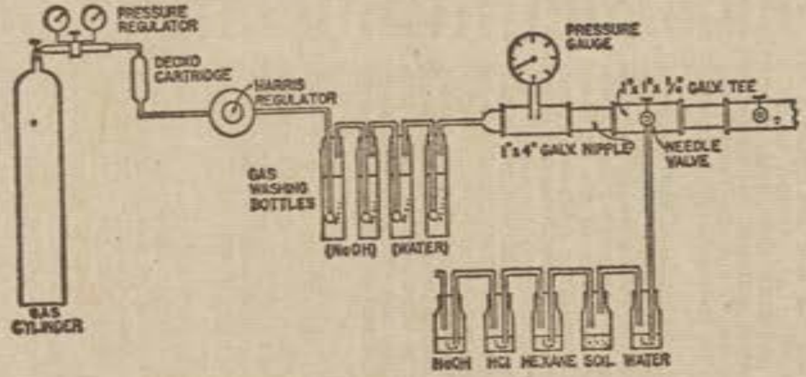
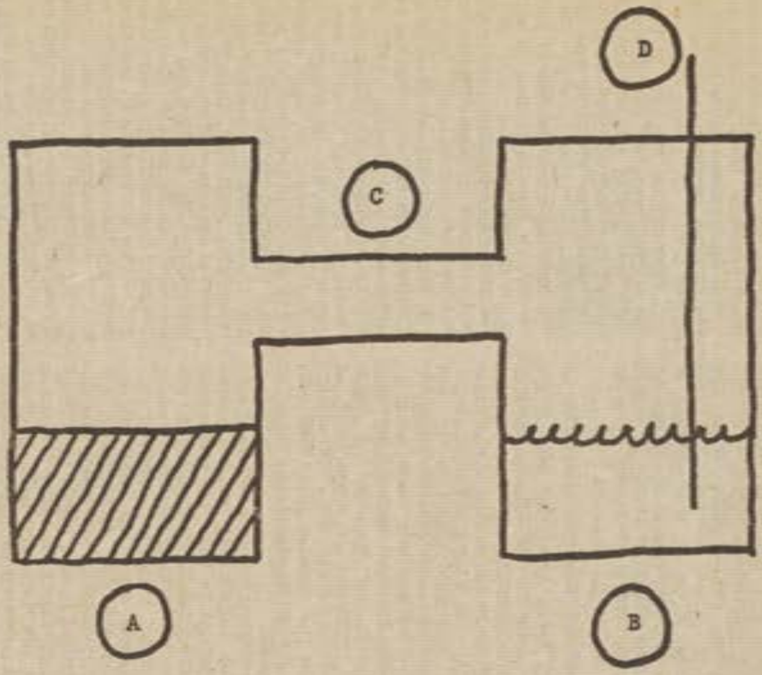


Figure 1. A Schematic Diagram of Multi-Purpose Manifold Assembly For Supplying Uniform and Constant Aeration to Individual Soil Systems During Incubation. (From Ref. 4.)



Ⓐ Soil Flask

Ⓑ NaOH Sump

Ⓒ Diffusion Arm

Ⓓ Oxygan Inlet Tube

Figure 2. Schematic Diagram of Soil Incubation Flask.

Soil Treatment. Soil pesticide treatments are preferably applied in sufficient aqueous solution to bring the soil to its desired moisture level and incorporate the pesticide simultaneously. Insoluble pesticides may be applied in acetone or ethanol. A maximum of 1-ml organic solvent per 100 g of soil should be used. The soil should be thoroughly mixed and watered to the desired level; the recommended soil moisture content is 75 percent of 0.33 bar moisture.

Replications. Either 2 or 3 replications are required.

Incubation Temperatures. A single temperature of 25°C is recommended for metabolism studies. A minimum of 2 temperatures are recommended for rate studies.

Chemical Purity. The chemical should be of known purity, i.e., technical or reagent grade. Radioactive labeling should be in a position of the molecule which allows characterization of significant breakdown products.

Carbon Dioxide Evolution. KOH or NaOH is used as a carbon dioxide trapping solution. The solution is sampled at appropriate intervals. The carbon 14 content of the trapping solution can be determined by liquid scintillation. Care should be taken to distinguish between radioactive carbon dioxide and other volatile carbon 14 products in the trapping solution.

Incubation Period. Sufficient units should be established to permit periodic sacrificing and characterization of degradation rates and product appearance and disappearance. Incubation should continue to a 90-percent loss of the parent pesticide and until patterns of accumulation and decline of products are established. Maximum length should be no more than 1 year since incubations longer than a single growing season probably become misleading due to the equilibrium established in the constant incubation conditions of a laboratory study.

Product Extraction and Identification. Incubated soils should be exhaustively extracted by a sequence of solvents. Product identification should be conducted on all materials comprising more than 10 percent of the initial application, or 0.1 ppm, whichever is greater. Other products in excess of 0.01 ppm should be identified where feasible. Characterization of unidentifiable products may include TLC mobility, GC retention time, relative polarity, UV absorbance on TLC, radioactive content (percent of original or total), or possible TLC spray reactions. In addition, extraction *p*-values are useful. These are defined (*6,7*) as the numerical fraction of solute (product of interest) partitioning into the upper phase of an equivolume, two-phase immiscible solvent system. For many compounds or relatively low polarity, the binary system composed of hexane and acetonitrile is desirable. However, for most polar products, other systems are more appropriate. When possible, a solvent system should be selected to give the greatest numerical spread between different products with similar physical properties. The utilization of this technique for polar organophosphate pesticides is described by Ahuja (*8*). When more than 10 percent of the radioactivity from the initial application remains in the soil after exhaustive extraction, the registrant shall proceed with a soil bound residue analysis.

Data Interpretation. The stability of parent material shall be reported as the average time required for a 50-percent loss ± standard deviation from the study. If products also warrant separate studies, they should be reported in the same manner.

Protocol for Anaerobic Soil Dissipation. Flooding or waterlogging a well-aerated soil can have an effect on many oxidation-reduction systems, which, in turn, may indirectly affect pesticide metabolism, fate and environmental behavior. For a more detailed discussion of soil anaerobicity, refer to the literature (*1–5, 9–13*). Two methods have been utilized to attain anaerobicity: (1) The atmosphere of an incubation chamber is purged of oxygen by substitution of inert gases carefully purified of their oxygen; or (2) a sample is waterlogged to decrease rate of oxygen diffusion below that required by the microbial pressure within that sample. Because some inert gases are toxic to some microbial populations, the second method would be preferred.

Establishment of Anaerobicity. The recommended method for establishing anaerobicity is flooding, with sequential evacuation and replacement of the atmosphere with nitrogen. The thickness of the water layer over the soil should be 2–3 cm. After flooding, the soil container should be evacuated and refilled with nitrogen 2 to 3 times to assure complete removal of oxygen. Substitution of inert gases without a water barrier to establish anaerobiosis is not recommended. A water barrier protects against low level oxygen leakage that is bound to occur with any but the most leakproof type of apparatus suitable for high vacuum work; rubber and most organic synthetics, for example, are too permeable to oxygen.

Incubation Vessel. The incubation vessel should be sealed with a cap; a closed container minimizes volatilization effects. Inlets and outlets should be provided to permit evacuation and introduction of nitrogen. All-glass systems are preferable; if unavailable, a bottle with a tight-fitting cap may be substituted.

Soil Types. The soil used for anaerobic studies should be the same soil used for detailed aerobic soil metabolism, except for specific anticipated uses, such as rice soils or aquatic pesticides. Preincubation of soil to assure anaerobic metabolism is unnecessary, if the procedure outlined above is followed.

Soil Treatment. The pesticide mixed with water is the preferred application. If solubility does not permit, then acetone or methanol diluted in water may be used. Pesticide application should not exceed 1 ml organic solvent per 100 g soil. Treatment concentrations recommended are 1 and 10 ppm for comparative rates of metabolism. Detailed product studies should be conducted at the 1-ppm level. Incubation should be at 25°C and in the dark.

Methodology. Additional procedures to be observed in the anaerobic studies include the following.

1. Sampling schedule used in anaerobic studies should parallel that used in aerobic studies. Anaerobic experiments should be conducted to the point where degradation rate can be established or interpreted.

2. Products different from those observed under aerobic conditions should be submitted to aerobic investigations.

3. Product identification and characterization should extend to same level as that in aerobic dissipation.

4. Both soil and water should be analyzed for carbon 14 content at each sampling period. Carbon dioxide may be monitored if desired. Carbon-14 balance procedures are encouraged; however, losses may be incurred through carbon 14 methane or acidic gas production.

5. The initial extraction solvent should be hexane to trap any possible methane. More polar solvents should follow. Hexane should be examined by gas-liquid chromatographic procedures sensitive to methane or other similar products.

6. A gas chromatography-gas proportional counting system capable of simultaneous measurement of metabolic gases (hydrogen, methane and carbon dioxide) from methanogenic systems has been described by Nelson and Zeikus (14).

7. Data should be reported in terms of disappearance of the parent pesticide and the formation and disappearance of products, with respect to length of incubation.

8. When more than 10 percent of the radioactivity from the initial application remains in the soil after exhaustive extraction the registrant shall proceed with a soil bound residue analysis.

Extraction Procedures for Soil Bound Residues. Often during soil dissipation experiments, a certain amount of radioactivity remains unextractable and is referred to as "bound residue." A proposed interim definition of soil bound residues is "that unextractable and chemically unidentifiable pesticide residue remaining in fulvic acid, humic acid, and humin fractions after exhaustive sequential extraction with nonpolar organic and polar solvents". Although the importance of these residues is not fully understood at present, a significant amount of many pesticides residues in soil fall into this category. Thus, it is essential to characterize the distribution of such residues in the soil organic matter matrix.

Stevenson (*15*) has suggested that methods used to fractionate soil organic matter can be placed in 2 categories: (1) Those used to fractionate and estimate compounds characteristic of plant tissues; and (2) those based on the division of the humus into subclasses possessing similar solubility characteristics.

The great difficulty with all fractionation procedures is that the methods employed either separate out products which are not definite chemical entities or that fractionation methods may form artifacts which do not have the properties of the original material. Nevertheless, the various fractionation procedures have proved useful for studying soil organic matter and soil bound pesticide residues.

Before determination of the bound residues, the soil should be exhaustively extracted with nonpolar and polar solvents, such as ether, benzene, ethyl acetate, acetonitrile, water, etc. It is possible that, in certain cases, a mild extraction of soil with dilute alkali (0.1 *N* KOH or NaOH or NH_4OH) after the exhaustive extraction with nonpolar and polar solvents may release some identifiable unbound degradation products. For characterization of bound residues the classical method of fractionating humus is based on the extraction of organic matrix from soil with caustic alkali and the further subdivision of the extracted material by partial precipitation with mineral acids.

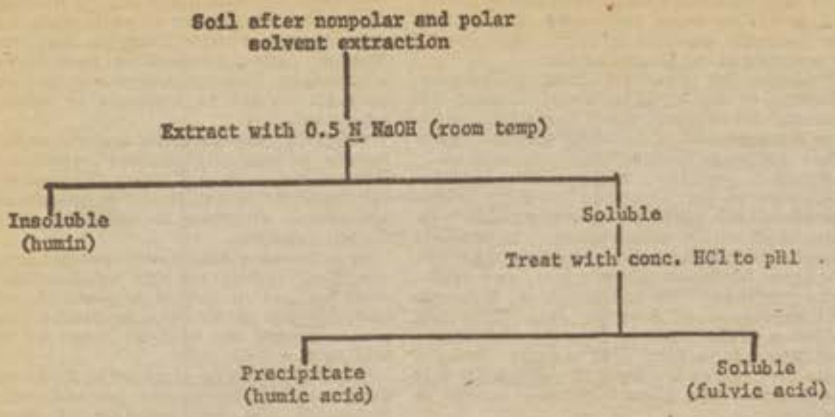

Soil after nonpolar and polar solvent extraction
Extract with 0.5 N NaOH (room temp)
Insoluble (humin)
Soluble
Treat with conc. HCl to pH1
Precipitate (humic acid)
Soluble (fulvic acid)

Figure 3. Fractionation Scheme Used to Characterize Distribution of Radio-labeled Bound Pesticide Residues in Soil.

In practice, 5 g of soil—after exhaustive organic solvent extraction—is shaken with 25 ml of 0.5 *N* NaOH in a shaker for 24 hr at 25° C. The soil solutions are then transferred to centrifuge tubes and centrifuged at 3000 rpm for 10 min. The supernatant is decanted, the soil is washed twice with 10-ml portions of 0.5 *N* NaOH and recentrifuged. The soil is finally washed with 3 10-ml volumes of water, centrifuged, air dried and set aside for combustion analysis. Unextracted radioactivity in soil solids is considered to be associated with the humin fraction and is measured by combustion analysis.

The combined supernatant and water washes are analyzed for radioactivity by liquid scintillation counting. The combined supernatant is then acidified with concentrated HCl to approximately pH 1. After the humic acids have precipitated, they are centrifuged. The remaining supernatant contains the fulvic acid fraction. The precipitated humic acids may be redissolved in 0.1 *N* NaOH. Radioactivity of the fulvic acid and redissolved humic acid fractions may be determined by liquid scintillation.

Although further characterization of these fractions will not be considered mandatory at this time, the registrant is urged to consider additional analytical methods proposed in the scientific literature (*15*).

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FIELD DISSIPATION STUDIES

Scope—Objectives. The objectives of field dissipation studies of pesticides are as follows:

1. To determine the rate of dissipation of the pesticide and its significant degradation products under fallow and cropped field conditions.

2. To determine the nature of significant degradation products of the pesticide under field conditions and compare with laboratory metabolism results.

3. To determine the potential carry-over of the pesticide and significant degradation products under field conditions for single applications and, where applicable, 3-year repeat applications.

4. To evaluate leaching in the soil under field conditions.

Two types of studies are required: (1) A qualitative study of the pattern of degradation of the pesticide under field conditions; and (2) one or 2 quantitative studies of the rates of dissipation of the pesticide and its significant degradation products under field conditions.

Qualitative Studies. Aerobic and anaerobic degradation studies of the pesticide in soil under laboratory conditions establish only the pattern of degradation of the pesticide in soil. A field study, involving application of the pesticide in the manner in which it is to be used, also takes into account the additional influence of light and/or plants on the pattern of degradation of the pesticide in the environment.

The radioactive pesticide should be applied as it would ordinarily be used with respect to method of application, type of formulation and rate of application. Where application to plants is involved, normal cultural practices should be used.

Sampling of the soil at various intervals and analysis for the pesticide and its significant degradation products should be conducted to develop a picture of the rates of disappearance of the pesticide and the rates of appearance and disappearance of its degradation products in soils. Plants should be harvested at maturity according to accepted practices. All soil and plant food and feed samples should be suitably processed for analysis and analyzed for discrete radioactive compounds and generally characterizable residues.

If significant amounts of radioactive residues are found in the soil at harvest, planting and analyses of rotational crops for discrete residues may be required. Furthermore, qualitative field dissipation studies may be required on more than one crop where there is some reason to believe that different degradation products will be encountered with different crops.

Quantitative Studies. Laboratory metabolism studies in soil and qualitative field dissipation studies establish the significant degradation products of the pesticide under field conditions. The aims of the quantitative field study are to establish disappearance curves for the pesticide and its significant degradation products under field conditions (predicting carryover and potential residue buildup at the same time) and to evaluate leaching into the soil profile. Most of the applications will be to soils and to plants. Normally the experiments would run for a year. However, where significant carryover is expected, 3-yr repeat applications may be required. Attempts should be made to correlate results observed for rates of dissipation under laboratory conditions with those observed under field conditions.

Table 1 summarizes and contrasts the qualitative and quantitative studies used in field dissipation experiments. Study II represents an alternate approach to residue Study III, which is potentially useful should analytical problems arise from Study III. Because the pesticide is incorporated in fallow soil in Study II, losses from photodegradation, plant uptake, and volatilization are minimized. Study III is normally conducted as a part of crop residue studies related to tolerances.

Protocol for Field Dissipation Studies—Site Locations. Sites for the test should be located in the regions of usage. These regions are outlined in USDA Handbook 296, *Land Resource Regions and Major Land Resource Areas of the United States* (1). Each site should be located on a major agricultural soil of the region and must be available over a 3-yr period to encompass 3-yr repeat application studies. Depending on the test, up to 4 or more sites are suggested. Descriptions of the soil profiles (obtained from the published soil survey) and heights of the water tables are required.

Site Characterization. The location of each site should be documented thoroughly in the following manner:

1. Thorough topographic description to include slope of the area, drainage, and land form.

TABLE 1.—*Types and characteristics of field dissipation studies*

Parameter	Patterns of dissipation, study I	Rates of dissipation	
		Fallow field study, study II	Residue study, study III
Objectives[1]	1,2,4,3	1,3,4,2	1,3.
Compound:			
Form	Radioactive	Nonradioactive or radioactive.	Nonradioactive.
Formulation	Technical or most widely used formulation.	Technical or most widely used formulation.	Most widely used formulation.
Locations	1	2	4.
Plots per location	1	2	2.
Crop	Yes	No	Yes.
Rate	Normal maximum annual recommended.	Normal maximum annual recommended.	Normal maximum annual recommended.
Application method	Normal pattern	Incorporate 0 to 7.5 centimeters.	Normal pattern.
Weed control	Hand weeding	Hand weeding	Normal cultural practices.
Sampling times (soil)	Sufficient to indicate dissipation curve.	Sufficient to establish dissipation and leaching curves.	At end of crop season, later if carryover occurs.
Sampling depth	7.5-centimeter increments in 0- to 30-centimeter zone; deeper as needed.	7.5-centimeter increments in 0- to 30-centimeter zone; deeper as needed.	15-centimeter increments in 0- to 30-centimeter zone; deeper as needed.
Duration	1 crop season	12 mo (minimum) or 90-percent dissipation.	1 crop season, longer if carryover occurs.

[1] Objectives as defined in the text.

2. SCS soil survey photo maps, if available.

3. Description of area from county soil survey maps.

4. Coordinates of field plots on topographic map, if available.

Climate. A general description of the climate of each site must be given; this is obtainable from various sources, including county soil survey maps.

The specific climate during a study should also be documented. Temperature patterns should be characterized for air and soil. If soil temperature data are not obtainable, as a minimum, air temperature records from the nearest U.S. weather station can be used. For actual soil measurements, temperatures at 3, 6 and 18 in. beneath the soil surface might be considered.

Minimum information regarding moisture during an experiment is a documentation of rainfall and irrigation patterns. Rainfall should be determined directly at a site with a rain gauge. Actual soil moisture patterns are helpful and can be determined by weekly sampling or by weekly readings of soil moisture tensiometers or soil resistance blocks. These could be located at 3, 6 and 18 in. beneath the soil surface. Twenty-four hr should be allowed after irrigation or rainfall before readings are taken.

Soil. The soil comprising each experimental area should be described in terms of soil series name, series description, textural classification, and the following physical properties: organic carbon content (%); soil pH (in 0.01 *M* $CaCl_2$ suspension); ⅓-bar soil moisture percentage; sand, silt, and clay contents (%); and cation-exchange capacity. The methods used in these determinations should be described or appropriately referenced. Information on the predominant clay minerals is usually available within the published soil survey and should be reported.

Pesticide Formulation. The most widely used formulation or the technical pesticide may be applied.

Methodology. Methods are summarized in Table 1. As indicated, each study encompasses several objectives. Recommended tests for establishing a soil dissipation curve consist of fallow plots with the chemical incorporated into the top 0-7.5 cm (approximately 0 to 3 in.) after spray application (Study II). The tests for carryover of residue (Study III) should utilize other plots established primarily for collection of plant residue data; these should be located near the fallow plots. Smaller plots (Study I) are also cropped, but their main purpose is to verify the patterns, rather than the rates, of dissipation. In the past, soil dissipation studies have utilized either bare plots or plots that simulate actual use practices. When one technique is used in the absence of the other, the resulting data suffers seriously in the following manner.

Data from actual use plots generally contain significant unavoidable errors because of the presence of a cover crop. Error arises from 2 sources. The first is the uneven distribution of the chemical initially applied to the soil because of the method of application and interception by the cover crop. The second is the renewal of chemical in the soil through transfer from plant to soil during the course of the study. This renewal can occur through washoff root exudation, and incorporation of crop residue at the end of the growing season. Thus, meaningful soil dissipation curves often cannot be obtained from such data. However, an actual use plot is necessary to determine carryover because of the possible transfer of chemical from crop to soil.

On the other hand, the fallow plot technique fails to consider the movement of chemical from plant compartment to soil compartment and, thus, it may or may not be suitable for evaluating carryover. This bare plot does, however, provide meaningful data for a soil dissipation curve because of the absence of the cover crop. The method of Baude, Pease and Holt (*2*) is particularly suitable for the study of field soil dissipation with radiolabeled pesticides and is the preferred method.

Sampling. Samples for Studies I and II should be taken before application (for a supply of check soil), immediately after application (for zero-time), 4 to 5 periods between zero and fall freeze, and once before planting the following spring. Replicates analyzed separately should be obtained at some, but not all, samplings to estimate variability for each experiment. Suggested samplings for replication might include zero and last sampling before winter.

In actual use tests for studying carryover (Study III), the most important sampling periods are zero-time and the following spring prior to planting the next crop. Soil samples should be obtained at these times; sampling in the fall is also advised. Zero-time serves to show how much chemical reaches the soil initially and the following spring shows whether residues are still present. True assay of the residue level in soil is possible only after all of the plant material has been incorporated; sampling at spring preplant is the best time for this condition.

Sampling periods between these points have less value, because of the large variability in application to soil initially and the continued renewal of the soil level by transfer from plant material to soil. However, the number of sampling periods for Study III will depend on whether Study II is conducted. When Study II is conducted, the sampling intervals described will be acceptable. Otherwise, a sufficient number of samplings should be conducted to permit plotting a well defined degradation profile.

All soil samples should be taken at sufficient depth and at sufficient intervals to be all-inclusive of parent chemical and significant metabolites in order to show degradation and extent of downward movement. Increments suggested in Table 1 will adequately define the vertical distribution. Although other methods can be used, multiple soil cores provide a convenient means of obtaining samples. Care should be exercised to prevent cross-contamination between various soil horizons. A method used by several researchers which appears suitable is described by Turner (*3*). The sampling method must be statistically valid and well-described. For other discussions of soil sampling, see reference (*2, 4–9*).

Treatment. Treatment should consist of the maximum use rate stated for a use pattern. Interpolation of results can be made for lower use rates, but extrapolation to higher dosages is risky.

Repeat Applications and Subsequent Cropping. If significant residues are present in soil at the end of the season, repeat applications, rotational cropping, or both, may be required to establish that no significant accumulation of residues or carryover of residues into rotational crops occurs.

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PART VII

Hazard evaluation:

Human and domestic animal toxicology VII.A-1
Aquatic toxicology VII.B-1
Wildlife toxicology VII.C-1

SUBPART A

Hazard evaluation: Human and domestic animal toxicology VII.A-1
Methods for study of acute toxicity VII.A-5
Methods for study of subacute and chronic toxicity VII.A-7
Methods for study of inhalation toxicity VII.A-13
Methods for study of skin and eye toxicity VII.A-14
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PART VII—HAZARD EVALUATION

SUBPART A—HUMAN AND DOMESTIC ANIMAL TOXICOLOGY

Part VII of the Registration Guidelines establishes the hazard evaluation data requirements necessary for the registration of pesticides. This Subpart sets forth acceptable protocols for the development of such data by establishing the general considerations to be followed in designing a specific testing procedure for a particular pesticide and specified data requirements. The general discussion is followed by references to protocols which the agency has determined are acceptable for developing hazard evaluation data.

In designing a specific test procedure, the pesticide developer must construct a testing protocol adapted to the specific chemical nature of the pesticide and the type of exposure to man or the environment which may be anticipated from the pesticide's use. The protocol references contained in this Subpart establish minimum experimental testing standards which must be met in planning, executing, and reporting data so that the data on the pesticide's hazard may be evaluated meaningfully. Each reference was chosen by EPA as an example of an experimental protocol which meets the general standard for experimentation required by EPA. Numerous other protocols were reviewed by EPA and have not been included in this Subpart because of a determination that the protocols would not provide the meaningful, reliable data required for an accurate hazard evaluation.

Besides setting forth specific protocols, the references cited in this Subpart also provide a discussion of the fundamental factors which should be weighed for developing an adequate testing design; for example, the variables to be considered in the selection of testing species, strains, and sample size and specific aspects of oncogenic and mutagenicity toxicity studies. The pesticide developer must consider these factors in designing specific testing protocols. EPA endorses the discussions contained in the references and will be guided by those factors in evaluating the adequacy of data submitted for registration. Specifically, knowledge of the chemical nature, purity and stability of the compound to be tested, the bio-chemical reactions of specific groups, the physiological activity of similar compounds and the techniques for measuring suspected chemical and biological changes of such compounds must be considered in designing an adequate experimental testing procedure is essential. Occasionally, it may be possible to predict the physiological action of a compound by structural relationship to other compound with known physiological actions. However, such predictions based on structure similarities are not infallible and general screening procedures for possible physiological actions must be done.

SELECTION OF SPECIES

A reliable *in vitro* screening technique is not available for determining the species most closely approximating the human physiological response to many pesticides. In some cases, it is possible to obtain metabolic and kinetic data in human volunteers or by epidemiological studies of occupationally exposed individuals which can be compared with similar data from experimental animals. If such data are available, the experimental animal species most closely resembling the known human response should be selected for additional long-term studies.

In reporting each study, the species and strain, source, sex, age, weight range and all other relevant details must be clearly stated.

SELECTION OF ROUTE OF ADMINISTRATION

The basic consideration which determines the route of administration is the anticipated route of exposure to man or the environment from the use of the pesticide. The experimental exposure should be the same or as closely related as possible to that anticipated for humans. Where the anticipated exposures indicate, for example, that the gastrointestinal tract represents the route of entry into the body, principles of proper established oral dosing must be applied. In the case of agricultural pesticides, the compound should be incorporated in the diet of the test animal and not merely given by oral intubation. If more than one route of exposure is anticipated or observed, sufficient testing must be done with each route to determine the toxicity or to define the difference in toxicity.

In reporting data, the details of the method of administration must be provided; for example, incorporated into ground laboratory chow as 25 percent corn oil solution; all diets including control adjusted to a 1 percent added corn oil level; or diets available ad libitum.

END POINTS

The biological activity of a pesticide may be evidenced in a change in the appearance of an organ or tissue of the test animal (organic change) or in a change in the activity of the organ or tissue (functional change). Thus testing must not be limited to the detection of organic changes, i.e., those detected by growth curves, organ weights, hematology and gross and microscopic pathology, but must provide a total evaluation of any changes in the test animal.

METHODS FOR STUDY

Subpart A is composed of sub-sections or "Methods for Study." As outlined in the table of contents to this subpart, these Methods for Study correspond to the nine test areas requiring data for human and domestic animal toxicology. In addition to the fundamental factors, listed above, for developing an adequate testing design, each sub-section describes additional principles or procedures needed for the particular test.

ACCEPTABLE PROTOCOLS AND GENERAL REFERENCES

Following each "Methods for Study" in this Subpart references to detailed examples of presently acceptable protocols and test methods are cited. These protocols and test methods are those presently considered adequate for developing data acceptable for registration purposes. The Agency recognizes that applicants may be aware of other test protocols which are equally effective for particular purposes and that new procedures will be developed in the future. It also recognizes that the test methods described sometimes may not be well suited to the evaluation of particular products. Thus, modification of the specific procedures contained herein may be appropriate provided that the intent and reliability of the suggested methods are met. In cases where an applicant proposes to deviate from the procedures suggested, an applicant should consult with the Agency on the specific data development methods to be employed. In addition, in a particular case, the applicant or the Agency may determine that all or any portion of a referenced protocol is not adequate for hazard evaluation. Upon such determination the Agency will work with the applicant to design an appropriate protocol(s).

The general references, which also follow each "Methods for Study," deal with specific questions which must be addressed in designing a specific test protocol. These include: Selection of diet, species, and strain; number of animals; duration of exposure; proper control groups; specific clinical measurements; statistical treatment of data. The investigator is encouraged to become familiar with these articles, since they provide the current experience of the profession and are valuable in the conduct of good toxicological research.

References

Committee on Problems of Drug Safety, National Research Council. 1969. Application of metabolic data to the evaluation of drugs. *Clin. Pharmacol. Ther.* 10:607-634.

METHODS FOR STUDY OF ACUTE TOXICITY

The following information should be made available in any report of studies on the acute toxicity of a chemical agent:

1. Exact identification of the compound studied, including chemical name, structure, and purity, with quantities of known and unknown contaminants given so that 100 percent of the sample is accounted for.

2. The species and strain(s) of test animals used, including source, sex, age, weight range, diet, housing and conditioning before the time of test.

3. The method of selection and method of division of animals into test groups.

4. All doses used, including the composition of all diluents; number of animals per dose level; the route(s) of administration together with the method(s) of administration; and nutritional conditions, such as fasting and period of fasting, before test.

5. The observation period; observational methods utilized; and description of premortem and nonlethal effects.

6. The LD-50 and its confidence limits together with an evaluation of the slope of the lethality curve and a maximal nonobservable-effect dose level; and reference to the statistical methods employed.

7. When indicated, as in delayed deaths or symptomology, the inclusion of gross pathology and possibly histopathology.

The conduct of acute toxicity tests should be in accordance with currently acceptable

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*More detailed *Contents* pages precede each Subpart.

principles of toxicologic expertise and statistical procedures as exemplified in the following references.

Acceptable Protocols and Methods

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Loomis, T. A. 1974. Essentials of Toxicology, Second Edition. Lea & Febinger, Philadelphia. (Pp. 145–215).

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METHODS FOR STUDY OF SUBACUTE AND CHRONIC TOXICITY

In general, the subacute or chronic studies should define the biological activity of a compound and provide a reliable estimate of the lowest dosage required to produce that effect following repeated exposure.

Every study should include the selection of the proper animal species. Two general principles are available to guide the investigator in selection of these species.

1. Whenever possible, one species should permit comparison of the toxicity of the test compound with known compounds tested in the same species as well as in man. This permits indirect estimation of the toxicity of the test compound to man through other compounds. At the present time, the rat permits this comparison better than any other experimental animal for most compounds.

2. Another mammalian species, other than rodent, should be selected on the basis of its particular similarity to the human in relation to the suspected physiological and metabolic mechanisms affected by the test compound. If no valid basis for such a prediction is available, safety is best assured by selecting the second species on the basis of greatest sensitivity to acute or short-term subacute toxic effects.

Selection of Route of Administration. The selected route of administration should be as nearly identical to the potential human exposure as possible. When the test material cannot be administered to animals by the proposed route because the animal will refuse to eat the test diet, administration by stomach tube may be necessary. In most cases, however, the animal can be conditioned to the off-flavor, smell, etc., by gradually building up the dietary concentration to the desired level.

Selection of Dosage. Before the selection of dosage, a review of the acute toxicity should be made. This review should consider not only lethal dose but also the variation in animal response to the same dose and the slope of the dosage-mortality curve.

Before designing a protocol for a subacute study, it is frequently desirable to perform a dose-range finding study. As the term indicates, such a study is designed to provide a reasonable estimate of the maximum dosage an animal will tolerate on repeated administration. It is a rapid empirical procedure to eliminate inappropriate dosages before more extensive subacute and chronic experiments. The most important observation is death. Since these experiments are of a very short duration—generally 1 to 2 wk—death at any dosage level is sufficient justification to eliminate that dosage from subsequent long-term studies. Additional observations may include evidence of the acceptability of diet, loss of body weight, organ weight changes, and symptoms.

Subacute experiments should not be considered as preliminary. Properly designed and conducted, the subacute experiment will provide the majority of the basic observations upon which the decisions for acceptability of use and commercial production will be based. Even when chronic experiments are later conducted, the observations made should be an outgrowth of initial suspicions or discoveries of the subacute phase. Therefore, effort should be concentrated in the subacute experiment on providing the best available screening for deleterious changes.

One of the principal values of a chronic study is that accelerated senile, degenerative and carcinogenic changes can be detected. Adequate numbers of animals should be used to permit detection of such changes, which may occur only in a fraction of the population of test animals. The number of animals will be partially dependent on the incidence of the effect in the control population as well as the desired degree of assurance that the effect is not produced in the experimental species selected. Several specific references deal with these considerations in depth.

All quantitative measurements taken should be examined by a statistical comparison of dosed and control animals as well as statements of central tendency and variability.

Acceptable Protocols and Methods

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Fitzhugh, O. G. 1965. Appraisal of the safety of chemicals in foods, drugs and cosmetics—Chronic oral toxicity. Assoc. of Food and Drug Officials of the U.S. Topeka, Kansas, Pp. 36–45.

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METHODS FOR STUDY OF INHALATION TOXICITY

A pesticide can be inhaled in either the vapor phase or as an aerosol, i.e., dust or mist. Inhalation may be a serious problem for consumers, applicators or field workers; the hazard may be altered by the type of formulation and mode of application. Studies designed to evaluate the potential hazard to humans must, therefore, relate to the physical form of the pesticide under specific use conditions. It should be stressed that a number of factors play roles in determining the ability of a material to be dispersed as an aerosol and, once dispersed, to remain airborne long enough to pose an inhalation hazard. It should also be recognized that inhalation exposure is often a more difficult procedure than administration by any other route. In general, consultation is advisable with scientists with experience in the use of inhalation chambers, vapor and aerosol dispersion, and sampling and analysis of chemical components present in the air of animal exposure chambers.

Inhalation, as a route of entry, results in the potential for (1) toxic effects at the site of entry, i.e., the lungs, as well as (2) the same systemic toxic effects that may occur from entry of the pesticide into the body via other routes. Specialized studies for changes in pulmonary function may be the most sensitive measurement of effect when the pesticide has its primary action on the dung itself. Systemic effects, including cancer, are measured by the same techniques utilized in studies with oral administration. Only recently have scientists begun to evaluate teratogenicity, mutagenicity and reproduction effects following inhalation exposure. No attempt is made here to document the specialized studies for pulmonary function, or the classical biochemical, physiologic and pathologic observations for systemic toxicity.

General principles and procedures for inhalation studies have been discussed by Drew and Laskin (1974) and by the Committee on Toxicology of the National Academy of Sciences-National Research Council (1964). These reports point up the necessity of considering a wide variety of factors which might have a much stronger bearing on inhalation hazard than hazard by other routes of administration. The other references are provided as representative applications of these principles to specific materials or groups of materials in a manner consistent with the state of the art. It should be stressed, however, that none of the studies can be considered comprehensive; rather they were directed to and answered questions concerning toxicity of the materials within a highly limited framework.

Acceptable Protocols and Methods

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METHODS FOR STUDY OF SKIN AND EYE TOXICITY

Handling any chemical or chemical formulation in quantity creates a potential for contamination of skin and eyes. Skin contact may result from accidental spillage or simple environmental contamination and can produce toxic effects by percutaneous absorption which may be similar to those resulting from ingestion or inhalation. Such contact may also produce dermatitis of the primary irritant or delayed hypersensitivity type. A variety of protocols for the study of acute and chronic percutaneous absorption and irritation are available for use with a limited number of animal species. Adequate procedures for the study of delayed hypersensitivity in animals, however, are not extensive, and the results of such animal studies cannot be considered entirely indicative of the results of exposure in humans. For this reason, protocols are available for human patch tests which are designed to determine the potential for the production of sensitization in the exposed humans. Such studies should be designed and performed by a competent dermatologist since the subjects are humans and there are medical, ethical and legal aspects to be considered.

Contact with eyes usually is the result of accidental contamination but may also result from exposures to atmospheres containing the chemical. Animals exposed for inhalation studies, where whole body exposure occurs, should be observed for both skin and eye effects. Acute eye contact studies can be made following one of several protocols; most employ the rabbit as the test animal.

Acceptable Protocols and Methods

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METHODS FOR STUDY OF REPRODUCTIVE AND TERATOGENIC TOXICITY

The physiological stresses associated with reproduction and lactation offer a unique opportunity for revealing toxic manifestations in experimental animals. The endocrinological changes associated with the reproductive cycle in the female and the anabolic systems involved in embryologic and fetal growth constitute a challenging background against which to test the toxic potentiality of a pesticide or other foreign substance. Conceivably, under these conditions, enzyme systems are called into play that are otherwise dormant, if indeed, existent. Behavioral phenomena, such as loss of sexual interest or maternal neglect, and defective prenatal developments are manifestations of toxic effects that can be detected only in appropriately planned experiments.

Abnormal reproductive performance may result from the direct influence of the toxic substance on fertility or on conceptual interest of one or both sexes, impaired implantation or gestation, prenatal undernutrition or placental transfer of toxicity to the developing embryo or fetus. Depending on the nature of the chemical and the degree of environmental or dietary exposure of man or other target species, the design of experimental protocols may extend from single reproductive cycles to multigeneration studies.

By far the most commonly used laboratory animal for reproduction studies is the rate. However, procedures have been described employing mice, hamsters, rabbits, swine and primates. For studies involving the environmental impact of pesticides, avian species are also recommended. (See Part VII. Subpart C.)

By dosing test materials before mating, effects on both male and female fertility may be noted. Copulation is established by the appearance of sperm in the vagina and the progress of gestation and delivery are noted. Litter size and weight and growth and survival of pups during the immediate postnatal and lactation periods are recorded. Observations such as these may be quantitated and statistically evaluated.

Reproductive cycles may be continued where the duration of fertility and gestational capability are of concern. In multigeneration studies, however, observations are generally limited to 3 or 4 generations and to 2 litters per generation, one of which is delivered by caesarian section. Signs of embryo- or fetotoxicity are noted and the fetuses are examined macroscopically for teratologic defects, the soft tissues after sectioning and the skeletal structure after clearing and staining.

Teratologic screening studies have shown that the rat and mouse provide more consistent and reliable data than the rabbit or hamster. The number of matings per dosage group required for adequate statistical interpretation of responses militates against the use of larger animals in reproduction and teratologic studies. However, where species differences may exist and must be clearly defined, the use of pigs, dogs or monkeys is indicated. It should be noted, however, that interspecies variations in response and the absence of correlation with human experience raise doubts concerning the significance of teratologic tests.

The following references cover basic principles and procedures employed, as recently described by pioneer workers in the field. They include detailed protocols recommended for regulatory purposes by the U.S. Food and Drug Administration and the World Health Organization.

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METHODS FOR THE STUDY OF MUTAGENICITY

A primary objective of mutagen testing is to determine whether a pesticide has the potential to cause heritable alterations in man. Direct methods for the assessment of heritable genetic defects in man do not exist. As a consequence, a wide variety of nonhuman and even non-mammalian test systems have been utilized in efforts toward the assessment of heritable damage induced in germ cells which may be of concern to man.

Certain mammalian tests are considered in and of themselves as sufficient criteria for stating that a chemical is likely to cause heritable mutations in human. These methods can assess a heritable risk and can be utilized in a manner consistent with good toxicological procedures, i.e., appropriate routes of administration, proper number for statistical purposes and dosages which approach human exposure levels. Misinterpretation of results could occur in one of these mammalian systems if the *in vivo* metabolism of the chemical in man is different than in the test system.

The tests recommended are the heritable translocation test, the *in vivo* cytogenetic test, and a specific locus test in rodents. These tests measure a variety of genetic damage. The heritable translocation test measures transmissible chromosomal aberrations. The *in vivo* cytogenetic test indicates the capacity of a particular chemical to cause chromosomal aberrations which may or may not be transmissable.

It has not yet been demonstrated that all chemicals which affect base-pair changes (gene mutations or small deletions) also cause chromosomal damage, therefore, it is essential that an assay method capable of detecting gene mutations be included. The specific locus test in mice fulfills this criterion, in that it measures mutations in specific recessive genes. Currently, there are only a few laboratories with the capacity or expertise to maintain the special strains of mice necessary for this test.

Registrants may find it useful to perform tests with other assay systems utilizing submammalian organisms and single cells for screening for a variety of genetic effects, including those which will not be detected by the whole animal tests.

ACCEPTABLE PROTOCOLS AND METHODS

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Heritable Translocation Test

Generoso, W. M. 1973. Evaluation of chromosome abberration effects of chemicals on mouse germ cells. *Environ. Health Perspectives.* 6:13–22.

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Specific Locus In vivo Test

Cattanach, B. M. 1971. Specific locus mutations in mice. Pages 535–540 in A. Hollaender, ed. Chemical Mutagens, Principles and Methods for their Detection, Vol. 2, Plenum Press, New York.

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METHODS FOR STUDY OF NEUROTOXICITY

In the field of behavioral toxicology, techniques are being rapidly developed with experimental animals that, hopefully, will provide more sensitive and specific predictions of neurotoxic effects in man (U.S. Department of Health, Education and Welfare, 1974). Presently, gross observations for neurotoxicity are an integral part of almost every toxicity study.

Some organophosphorus compounds are known to cause a delayed locomotor ataxia in man. This neurotoxic effect has not been readily observed in rats but does occur in hens. Pesticides that are organophosphorus compounds may be studied for their ability to produce a delayed neurotoxic effect in hens (Davies et al., 1960; British Working Documents 1967).

Acceptable Protocols and Methods

British Working Documents. Oct. 1967. No. 2. Test for Neurotoxicity of Organophosphorus Compounds, Ministry of Agriculture, Fisheries and Food. London.

General References

Davies, D. R., P. Holland and M. J. Rumens. 1960. The relationship between the chemical structure and neurotoxicity of alkyl organophosphorus compounds. *Brit. J. Pharmacol.* 15:271–278.

U.S. Department of Health, Education and Welfare. 1974. Worker exposure to pesticides in behavioral toxicology. Session III. Pages 147–193 *in* C. Xintaras, B. L. Johnson and I. deGroot, eds. Early Detection of Occupational Hazards. HEW Publ. No. (National Institute of Occupational Safety and Health) 74–126. USGPO Washington, D.C.

METHODS FOR STUDY OF INTERACTIONS

Pesticides are commonly prepared in formulations prior to use. The excipients of such formulations, although not usually affecting the intrinsic toxicity of the pesticide itself, may alter such characteristics as absorption. The influence of excipients may, in turn, influence the observed toxicity, resulting in an increased or decreased effect. Thus protocols for toxicity studies must evaluate the effect of the formulation as used, and care must be exercised if any extrapolation is made for an altered formulation.

Formulations of pesticides will also often contain synergists, such as piperonyl butoxide, or a mixture of one or more active pesticides. The toxic action resulting from such combinations may be independent for each compound, but it is likely that a more than additive, or less than additive, joint toxic action may be observed. The basic principles for detecting such actions, often called synergism, potentiation or antagonism, are described in the literature (Smyth et al., 1969, 1970).

The task of studying all combinations of pesticides for unwanted interactions is a physically impossible one. Fortunately, there is an understanding of the biochemical mechanism for interaction between certain combinations of pesticides that are known to produce more than additive effects. For example, it has been recommended that "studies on the inhibition of plasma and liver aliesterase should be required on all anticholinesterase pesticides" (Mrak Commission 1969; Su et al., 1971; Murphy and Cheever, 1972; Cohen and Murphy, 1974). Another important mechanism for the interaction of pesticides with other pesticides, drugs and other environmental chemicals is the alteration of the microsomal, drug-metabolizing enzymes of the liver and possibly other organs. The ability of a pesticide to induce such enzymes will often be a part of the studies on mechanisms of pesticide toxic action.

Although specific protocols must be designed for individual circumstances, it is prudent to evaluate the significance of these interactions, as man may be exposed to multiple environmental chemicals when using pesticides (Mrak Commission, 1969; Conney and Burns, 1972).

Acceptable Protocols and Methods

Cohen, S. D. and S. D. Murphy. 1974. A simplified bioassay for organophosphate detoxification and interactions. *Toxicol. Appl. Pharmacol.* 27:537–550.

Smyth, H. F., Jr., C. S. Weil, J. S. West, and C. P. Carpenter. 1969. An exploration of joint toxic action I. Twenty-seven industrial chemicals intubated in rats in all possible pairs. *Toxicol. Appl. Pharmacol.* 14:340–347 (errata 15:247).

General References

Conney, A. H. and J. J. Burns. 1972. Metabolic interactions among environmental chemicals and drugs. *Science* 178:576.

Mrak Commission. 1969. Interactions. Pages 507–516 *in* Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health. U.S. Dept. of Health, Education and Welfare.

Murphy, S. C. and K. L. Cheever, 1972. Carboxylesterase and cholinesterase inhibition in rats. Abate and interaction with malathion. *Arch. Environ. Health* 24:107.

Smyth, H. F., Jr. C. S. Weil, J. S. West, and C. P. Carpenter. 1970. An exploration of joint toxic action II. Equitoxic versus equivolume mixtures. *Toxicol. Appl. Pharmacol.* 17:498–503.

Su, M-Q., F. K. Kinoshita, J. P. Frawley, and K. P. DuBois. 1971. Comparative inhibition of aliesterases and cholinesterase in rats fed eighteen organophosphorus insecticides. *Toxicol. Appl. Pharmacol.* 20:241–249.

METHODS FOR STUDY OF REENTRY INTERVALS

A number of sporadic episodes of acute adverse effects in field workers have been ascribed to toxic levels of pesticide residues on plant surfaces. Although no deaths have occurred, many workers have required medical care and treatment. The establishment of field worker reentry intervals appears to offer a practical approach to preventing worker exposure to hazardous residue levels.

At present it is not possible to identify, in the agricultural work place, a single or reliable indicator for establishing adequate reentry intervals. Nor is it possible to precisely enumerate all variables in the agricultural environment influencing residues and their potential availability to field workers. For these reasons, research designs, protocols and techniques are still in the developmental phase. A presentation of the present state of the art, recent experimental activity and suggested approaches may be found in the *Report of the Task Group on Occupational Exposure to Pesticides* (1974).

Establishment of reentry intervals for a specific pesticide-crop-cultural practice combination is currently conceived as a 2-step process: (1) postulating a reentry interval; and (2) testing the postulated interval in the field. Data used in step 1 must be related to the factors which are known to influence, or are suspected of influencing, the level of residues, their modification and persistence. Some of these factors are: (1) The physical and chemical properties of the applied product; (2) the method, rate and frequency of application; (3) the dermal, inhalation and oral toxicity of residues to which the worker is exposed; (4) the environmental and meteorologic conditions which affect the pesticide or its breakdown products; and (5) the route, degree and duration of worker exposure to the residues as influenced by cultural and harvesting practices for the treated crop. All available information relevant to the toxicology, degradation rate of the pesticide residues, worker exposure potential as it relates to cultural practices, and meteorological conditions are used to postulate a reentry interval.

The correlation of environmental factors as they affect cultural practices, the degree of worker exposure and the adverse response of workers to pesticide residues is not clearly understood. Therefore, at least 2 data collecting sites that differ in climatic, crop cultural and edaphic conditions must be selected because data collected in one geographical area may not be relevant to another with different environmental conditions. With proper planning, these sites may be the same sites chosen for collecting tolerance residue data.

Before applying the pesticide, the investigator should obtain the spray history of the plot to insure that pre-existing residues will not affect the experimental results. The actual application operation must be carefully supervised to insure that quantities delivered are consistent with proposed or actual label recommendations. Further, the application should be made in the season and at the frequency dictated by pest management requirements.

Meteorological data in the area containing the plot should be recorded daily between application of the pesticide and completion of the experiments. Usually there is a weather station nearby which will record daily high and low temperatures, rainfall, humidity, wind and light intensity. If the growth characteristics of the treated crop produce microenvironmental conditions which differ from those usually encountered in the area, data collection at the plot site is essential.

Chemical analysis for reentry data must include the levels of dislodgable residues for active substances applied to the crop and their major breakdown products. A dislodgable residue is one which is easily removed from the plant surface by a simple wash and is thereby distinguished from residues released from within the leaf or its surface waxes by organic solvent or homogenization. The latter are normally not available for worker exposure. Sampling must be frequent enough to define a decline curve of the residues, including any plateau which may occur with time. The final result of the analysis should be a measure of residue potential expressed in mg or µg of the pesticide and its toxic degradation products cm sq of plant surface. Samples must be collected from soil in the plot and developed in the same manner, since recent evidence indicates that dust may be a significant dermal and respiratory route of exposure for field workers. Gunther et al. (1973) present a set of procedures for establishing dislodgable residue values on citrus. Also included in this reference are discussions of sampling procedures and a description of leaf punches used in sample collection. Although additional research may uncover other methods more predictive of the respiratory and dermal dose variables, at present these techniques appear to be most suitable.

Air sampling should be carried out while the crew is actually at work in the field The objective is to define the respiratory dose potential at the breathing zone of the worker. Investigators should consult with experienced industrial hygienists for this phase of the experiment.

The discussion thus far is related to the data to be considered with the toxicology information in establishing a postulated reentry interval. Testing this interval is an occupational health problem requiring qualified professionals in this field. Research involving human subjects raises a host of questions; medical and ethical considerations are of particular concern. If appropriate procedures are followed, the risk to participants can be held within acceptable limits and the results can serve to reduce the hazard to all field workers exposed in the course of routine cultural operations. The recommendations made by the Task Group on Occupational Exposure to Pesticides contain guiding principles and suggestions for experimental designs in this area.

Acceptable Protocols and Methods

Federal Working Group on Pest Management. 1974. Report of the Task Group on Occupational Exposure to Pesticides. U.S. Environmental Protection Agency. Washington, D.C.

Gunther, F. A., W. E. Westlake, and J. H. Barkley. 1973. Establishing dislodgable pesticide residues on leaf surfaces. *Bull. Environ. Contam. Toxicol.* 9(4):243-249.

SUBPART B

Hazard evaluation: Aquatic toxicology VII.B-1
  Acute toxicity test methods...... VII.B-6
  Chronic toxicity and partial chronic toxicity test methods. VII.B-7
  Biological uptake and food chain transfer test methods.......... VII.B-29
  Field testing techniques......... VII.B-49

PART VII—HAZARD EVALUATION

SUBPART B—AQUATIC TOXICOLOGY

Terminology

Acute toxicity test refers to a test conducted to determine the concentration of toxicant in water which causes a defined effect (usually mortality, but sometimes other effects, such as reduced shell deposition in oysters) on 50 percent of the exposed population in some short time interval, typically 48 or 96 hr.

Chronic toxicity test refers to an experiment in which the test animal is cultured in the presence of toxicant from egg to egg or from one stage in the life cycle to the same stage in the next generation. Various parameters, including survival growth rate, locomotor activity, behavior changes and reproductive effects are measured to determine the effects of prolonged exposure.

Experiments extending over intermediate lengths of time are referred to as subacute toxicity tests or partial chronic tests. *Subacute toxicity* usually indicates adverse effects of a toxicant that occur after exposures of more than 1 wk but not through an entire life cycle. Examples of subacute effects, in addition to mortality, include impaired growth or locomotor activity, behavioral changes, predator avoidance, and pathological changes. A *partial chronic test* is an experiment which includes the reproductive phase but not all stages in the life cycle of one generation of the species tested.

The term *biological uptake* is used to refer to the incorporation of a pesticide into the tissue of a test species after exposure to the pesticide in water.

Food chain transfer refers to uptake through the food as distinct from uptake from water.

Because some methods have not been as well tested and accepted as others, each method included in this subpart has been characterized as routine, tentative or developmental. The characterizations are not intended to imply that a routine method is the best or only method or that a developmental method yields less valid results, but rather to indicate the degree of past usage and acceptance of a method.

1. *Routine Method*. The method has been used by innumerable toxicologists and other investigators over an extended time period with a wide variety of toxicants. Application of the method has become relatively uniform in testing laboratories, although a high degree of technical skill is necessary at least in some cases. The data output for a given compound tested in different laboratories can be expected to be similar.

2. *Tentative Method*. The method has been used by 2 or more toxicologists over a period of several years with a limited number of toxicants. There is no consensus among toxicologists on the detailed application of the method or sufficient information to show that the data output in interlaboratory tests would be consistent.

3. *Developmental Method*. The method has been proposed by 1 or a few toxicologists and used to test a few compounds by the original researcher(s). There is no consensus that the method provides appropriate data or that modifications of the method would not be appropriate. Techniques involved may not be well-known to other toxicologists, and, therefore, other toxicologists may require considerable experience with the method before they can obtain consistent results.

The tests for which protocols are presented are listed below with an indication of the category.

Toxicity Tests:	
Acute:	
Freshwater fish	Routine
Marine fish	Routine
Freshwater invertebrate	Routine
Marine invertebrate	Routine
Chronic:	
Fathead minnows	Routine
Sheepshead minnow	Developmental
Daphnia	Developmental
Midge	Tentative
Partial Chronic:	
Brook trout	Tentative
Bluegill	Developmental
Accumulation Tests:	
Biological uptake	Tentative
Food chain transfer	Developmental
Field Methods	Developmental

CONSIDERATIONS FOR MARINE TOXICITY TESTING

The general facility requirements for a toxicology test laboratory identified in the methods for freshwater systems apply also to marine systems. Whenever possible, natural sea water should be used.

Delivery of sea water to the laboratory is simple in principle but frequently difficult in fact. Subsurface water is typically pumped into the laboratory through 2-4 in. plastic pipes (PVC with PVC or nylon connectors) to prevent introduction of toxic metals. The pump should have a stainless steel impeller. No other metal should be in contact with the sea water. The volume of flow should exceed the volume required for all tests by a considerable margin.

Because fouling organisms, such as barnacles, sea squirts, oysters, etc., will enter the lines as larvae and settle in the pipes and reduce flow and increase turbidity, a dual system of pump and pipes is usually installed. One line may then be turned off, drained, filled with fresh water, or simply let stand for a period, and back flushed, while the other line supplies the laboratory. Lines should be rotated on a regular basis to safeguard against fouling and to exercise the pump. Details of systems found practical in various situations are described by Clark and Clark (1964), but improved systems continue to be designed (DeBen 1970; White et al. 1973). Various marine laboratories around the country can advise on system design.

Natural sea water should, *at a minimum*, permit the maintenance of healthy test organisms for the period required for laboratory acclimation and testing. Since oyster larvae or copepods are more sensitive to many toxicants than other species, a more realistic criterion for acceptable sea water is that these species should survive and/or develop normally for 1 wk. Several other criteria should also be met if possible. The salinity of the water should be greater than 15‰, with tidal variations less than 5‰. Turbidity should be minimal to simplify water delivery. Other criteria for diluent water as set forth in Stephan et al. (1975) should also be met.

In cases where salinities are less than 15‰ or diurnal variations are great (greater than 5‰), ancillary equipment should be installed to maintain the salinity of the incoming water at a desired level. This can be accomplished by controlled addition of a brine prepared with an artificial sea salt mixture (Wood 1965; DeBen 1970). In situations where high turbidity is encountered, filtration may be desirable, using either a rapid sand system (White et al., 1973) or industrial filter cartridges. The water may be sterilized by passage over ultraviolet light (e.g., Shelbourne 1962). Commercial ultraviolet sterilizers are also available.

Instrumentation is necessary to determine salinity on a routine basis. Of the methods available, titration of chloride with silver nitrate (Strickland and Parsons, 1968), refractometric methods or the conductivity method are preferable because of their accuracy. The latter method has the greatest accuracy, requires the least amount of time and can be used as an on-line monitor. Conductivity salinometers are commercially available. A supply of Standard Sea Water is necessary for calibration purposes (available from the Supply Department, Marine Biological Laboratory, Woods Hole).

Acute tests in static systems can be conducted with artificial sea water, since only small volumes of water are required. Several artificial sea salt preparations are available commercially. Instant Ocean® (Aquarium Systems, Inc.) has been shown by many investigators to be suitable for the culture of many, though not all, marine invertebrates and fishes. However, variability in the salt mixture may arise as a result of changes in the formulation, and all preparations should be tested for toxicity before use in toxicity tests.

Commercial artificial sea water preparations have been found inadequate for studies involving some marine molluscs and especially their larvae. Several suitable formulations from technical grade chemicals have been reported in the literature. An appropriate formula is included in Stephan et al. (1975).

The report by Stephan et al. (1975) indicates the desirability of testing marine organisms at salinities of 5, 15 and 35‰ to determine the effect of salinity on acute toxicity. It should be noted that these salinities are outside the tolerance range of some species. The range of salinity tested should be within the tolerance range of the test species, and the test animals should be carefully acclimated several days prior to the test.

References

Clark, J. R. and R. L. Clark, eds. 1964. Seawater systems for experimental aquariums. U.S. Dept. Int., Fish. Wildl. Serv., Bur. Sport Fish. Wildl., Res. Rep. #63, 192 pp.

DeBen, W. A. 1970. Design and construction of a saltwater environment simulator, FWQA, Pacific N.W. Water Lab., Working Paper 71:1–30.

Shelbourne, J. E. 1962. Experimental seawater systems for rearing fish larvae. Pages 81–93 *in* J. R. Clark and R. L. Clark, eds. Sea-water systems for experimental aquariums. U.S. Dept. Int., Fish. Wildl. Serv., Bur. Sport Fish. Wildl., Resp. Rep. #63, 192 pp.

Stephan, C. E., chairman, Committee on Methods for Toxicity Tests with Aquatic Organisms. 1975. Methods for acute toxicity tests with fish, macroinvertebrates, and amphibians. U.S.E.P.A., Ecol. Res. Rer. (In press).

Strickland, J. D. H. and T. R. Parsons. 1968. A practical handbook of seawater analysis. Fish. Res. Board Can. Bull. No. 167. 311 pp.

White, D. B., R. R. Stickney, D. Miller, and L. H. Knight. 1973. Sea water systems for aquaculture of estuarine organisms at the Skidaway Institute of Oceanography. Ga. Mar. Sci. Center, Technical Rep. Ser. No. 73-1. 18 pp.

Wood, L. 1965. A controlled conditions system (CCS) for continuously flowing seawater. *Limnol. Oceanogr.* 10:475–477.

ACUTE TOXICITY TEST METHODS

Bahner, L. H., C. D. Craft and D. R. Nimmo. 1975. A saltwater flow-through bioassay method with controlled temperature and salinity. *Progressive Fish Cult.* (In press).

Butler, P. A., E. Berry, W. B. Breese, A. Calabrese, J. I. Lowe, G. E. Morrison, V. van der Schalie, and C. E. Woelke. Toxicity to mollusks. Standard methods for the examination of water and wastewater, 14th ed. American Public Health Association, New York (In press).

Three methods are included: The bivalve embryo test; the shell deposition test; and the long-term growth test. This paper is currently undergoing final revision and will be provided when available. Available from Dr. P. A. Butler, Gulf Breeze Environmental Research Laboratory, Sabine Island, Gulf Breeze, Florida 32561.

Stephan, C. E., chairman, Committee on Methods for Toxicity Tests with Aquatic Organisms. 1975. Methods for acute toxicity tests with fish, macroinvertebrates, and amphibians. U.S. E.P.A., Ecol. Res. Ser. (In press).

A number of "recommended" species are listed in this publication, most of which would be acceptable to EPA. An exception is the goldfish, *Carassius auratus*. Bluegill and rainbow trout remain the preferred species for acute toxicity tests.

Woelke, C. E. 1967. Measurements of water quality with the Pacific oyster embryo bioassay. Water Quality Criteria, ASTM STP 416. American Society for Testing and Materials. pp. 112–120.

CHRONIC TOXICITY AND PARTIAL CHRONIC TOXICITY TEST METHODS

Biesinger, K. E. and G. M. Christensen. 1972. Effects of various metals on survival, growth, reproduction and metabolism of *Daphnia magna*. *J. Fish. Res. Board Can.* 29:1691–1700.

This paper should be used in conjunction with Biesinger (1974a).

Biesinger, K. E. 1974a. Tentative procedure for *Daphnia magna* chronic tests in a standing system. EPA National Water Quality Lab., Duluth, Minnesota. (Exhibit 1).

——— 1974b. Tentative procedure for *Daphnia magna* chronic tests in a flowing system. EPA National Water Quality Lab., Duluth, Minnesota. (Exhibit 2).

——— 1974c. Culturing methods for *Daphnia* and certain other cladocerans. EPA National Water Quality Lab., Duluth, Minnesota. (Exhibit 3).

Derr, S. K. 1974. Tentative chronic bioassay procedure for the midge *Chironomus tentans*. (Exhibit 4).

Hansen, D. J. and S. C. Schimmel. 1974. Chronic bioassay using sheepshead minnows (*Cyprinodon variegatus*). (Exhibit 5).

This method should be used in conjunction with Schimmel and Hansen (1974).

Schimmel, S. C. and D. J. Hansen. 1974. Sheepshead minnow (*Cyprinodon variegatus*): An estuarine fish suitable for chronic (entire life-cycle) bioassays. *Proc. S.E. Assoc. Game Fish Comm.* (In press).

National Water Quality Laboratory, Committee on Aquatic Bioassays. 1971. Recommended bioassay procedure for fathead minnow *Pimephales promelas* (Rafinesque) chronic tests. National Water Quality Laboratory, Duluth, Minnesota. 13 pp. (Revised January, 1972).

National Water Quality Laboratory, Committee on Aquatic Bioassays. 1971. Recommended bioassay procedures for bluegill *Lebomis macrochirus* (Rafinesque) partial chronic tests. National Water Quality Laboratory, Duluth, Minnesota. 11 pp. (Revised January, 1972).

———. 1971. Recommended bioassay procedure for brook trout *Salvelinus fontinalis* (Mitchill) partial chronic tests. National Water Quality Laboratory, Duluth, Minnesota. 11 pp. (Revised January, 1972).

EXHIBIT 1

TENTATIVE PROCEDURE FOR DAPHNIA MAGNA CHRONIC TESTS IN A STANDING SYSTEM

By Kenneth E. Biesinger. EPA National Water Quality Laboratory, Duluth, Minnesota

A. *Physical system*

1. *Test containers*. Two-hundred and fifty ml beakers containing 200 ml of test water are recommended.

2. *Toxicants*. Toxicant mixing is best accomplished in one or two liter flasks which can then be poured into test containers. The toxicant must be renewed each week; this is best accomplished by setting up clean beakers with the food and toxicant added, and then transferring adult daphnids. Analytical testing of toxicant concentrations must be made at the beginning and at the end of each week; if the compound is volatile then intermediate analysis are needed.

3. *Duplication*. For each test four beakers each containing five daphnids must be run for each concentration tested as well as for the control (i.e., the test must be run in quadruplicate).

4. *Replication*. Three separate tests must be for each toxicant.

5. *Aeration*. Aeration is not recommended.

6. *Cleaning*. All glassware must be thoroughly washed and rinsed with distilled water. Test containers and flasks must have an additional three rinses with the water to be tested just before a test is to be initiated. For testing of metals an intermediate half hour soaking of glassware in 20% nitric acid is needed. For testing of organic compounds an intermediate thorough rinsing of glassware by acetone is needed.

7. *Solvents*. If solvents are used with organic toxicants the same amount of solvent must be added for each concentration of the toxicant to be tested. In addition to a water control a solvent control must also be tested.

8. *Light and photoperiod*. Fluorescent bulbs using a combination of Durotest (Optima) and wide spectrum Grow-lux bulbs with a 16 hour photoperiod (automatically controlled) are recommended.

9. *Temperature*. A temperature of 18±1° C is recommended.

10. *Toxic materials*. Use of dechlorinated tap water is not recommended; a concentration of less than 1 µg/1 chlorine will result in death to daphnids. Rubber and many other commonly used laboratory apparatus are toxic to daphnids; the toxicity of any questionable material may be tested for three weeks and, if there is something toxic, it will be evident by noting a reduction in young production if not mortality. Plastics are not suitable for testing of organic compounds. Silicone rubber cement is nontoxic with sufficient leaching.

B. *Biological system*.

11. *Acclimation*. Laboratory raised animals may be tested at any time. *Daphnia* collected in the field should be reared through two generations before commencing chronic studies.

12. *Food and feeding*. A suspension of food (1 ml/1) should be fed once weekly when the toxicant is renewed. We recommend adding a suspension of food containing Cerophyll and trout fry granules. The food suspension is prepared by weighing out 0.5 grams of Cerophyll and 10 grams of enriched trout fry granules. These are added to 250 ml of lake, well, or river water and mixed vigorously in a blender for five minutes. The suspension is then strained through stainless steel screen (105 mesh with 0.165 inch openings); and an additional 50 ml of water is used to rinse the blender and added to the above suspension. The food thus prepared is stored in a refrigerator and thoroughly mixed each time an aliquot is withdrawn.

13. *Testing methods*. It is recommended that young daphnids, 12±12 hours old (if reared at 18°C) be placed in test chambers and subjected to test conditions for three weeks. Daphnids should be transferred with an eye dropper into clean containers each week. Survival of the initial animals added should be noted after one week, two weeks, and three weeks. Reproduction should be noted by counting the young produced each week; the young should be counted and discarded each time the initial animals are transferred and at the end of each experiment. It is recommended that five daphnids be placed in 200 ml of water in 250 ml beakers. Four beakers should be used with a total of 20 animals for each experimental condition for each test. The beakers must be randomly distributed on a shelf and re-randomized each week. The beakers must be covered with a pane of glass and placed in a tray of water to minimize evaporation.

14. *Concentrations*. The number of concentrations to be tested should be from four to eight depending on the toxicant and the effects to the initial animals as well as to the effects on reproduction. Initial concentrations tested should be designed to bracket published results (i.e., above and below); however, as daphnids have not been tested on a chronic basis to many toxicants, experiments often have to be repeated before arriving at "no effect" levels. After delineating the concentrations to be tested, three successful tests should be run for each toxicant in which sixty animals would be tested for

each concentration. Adult survival in the control water must be 70% or more after three weeks for the test to be valid.

15. *Statistical evaluations*. Statistical evaluations of results for adults may be made using the method of Litchfield and Wilcoxon (1949) for establishing approximations of the 95% confidence limits for survival. Semilogarithmic probability paper is used for analyzing results. The terminology recommended by Sprague (1969) is used for survival (lethal concentration=*LC*) and represents three or more partial effect concentrations.

Statistical evaluations of results for young may be made using an Analysis of Variance on the young produced during three weeks of exposure by combining three tests and determining the sources of variation due to: Experiments, treatments, and experiments X treatments. Dunnett's Test ($P = .05$) is recommended to find the concentrations significantly different from the control.

References

Litchfield, J. T., Jr. and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect experiments. *J. Pharmacol. Exp. Ther.* 96: 99–113.

Sprague, J. B. 1969. Measurement of pollutant toxicity to fish. I. Bioassay methods for acute toxicity. *Water Res.* 3:793–821.

EXHIBIT 2

TENTATIVE PROCEDURE FOR DAPHNIA MAGNA CHRONIC TESTS IN A FLOWING SYSTEM BY KENNETH E. BIESINGER. EPA NATIONAL WATER QUALITY LABORATORY, DULUTH, MINNESOTA

A. *Physical system*.

1. *Diluter*. Proportional diluters (Mount and Brungs, 1967) (or other suitable delivery devices) should be employed for testing to obtain the most toxic conditions. A series of two diluters should be employed: the first for adding food and the second for adding toxicants. If solvents are added then modifications of the diluter should be made to enable adding the same amount of solvent for each concentration; this is most easily accomplished by having separate toxicant injectors for each concentration to be tested.

2. *Toxicant mixing*. A container to promote mixing of toxicant with water should be used between the diluter and the tanks for each concentration. Separate delivery tubes should run from this container to each quadruplicate tank. The same amount of water and toxicant must be added to each quadruplicate tank; the same volume must be added to all tanks.

3. *Quadruplicates*. Use true quadruplicates for each tank concentration (there should be no tank water connections between any of the four tanks). The location of each test tank should be determined by stratified random assignment.

4. Each tank, preferably all glass (we use battery jars), should contain at least two liters of water. Drainage is most easily accomplished by cutting a two inch notch at the top of the jars and attaching stainless steel screen (105 mesh with 0.165 inch openings) by silicone rubber cement over the openings.

5. *Flow rate*. Flow rates for each tank should be 2–4 tank volumes/24 hrs. If a diluter is adding more than 50 ml/cycle then a purge chamber is recommended (i.e. an intermediate tank having a siphon going into each test tank).

6. *Aeration*. Aeration is not recommended. Total dissolved oxygen levels should never be allowed to drop below 80% saturation.

7. *Cleaning*. The diluters and test tanks must be thoroughly cleaned once each week. The test tanks are most easily cleaned by setting up new tanks and transferring daphnids with an eye dropper.

8. *Light and photoperiod*. Fluorescent bulbs using a combination of Durotest (Optima) and wide spectrum Grow-lux bulbs with a 16 hour photoperiod (automatically controlled) are recommended.

9. *Temperature*. A temperature of 18±1°C is recommended.

10. *Toxic materials*. Testing in dechlorinated tap water is not recommended; a concentration of $<1\mu$g/1 chlorine will result in death to daphnids. Rubber and many other commonly used laboratory apparatus are toxic to daphnids; the toxicity of any questionable material may be tested in standing systems for three weeks and, if there is something toxic, it will be evident by noting a reduction in young production if not mortality. Plastics are not suitable for testing of organic compounds. Polyvinyl chloride tubing and silicone rubber cement are nontoxic with sufficient leaching and therefore, these materials along with glass are recommended for all testing.

B. *Biological system*.

11. *Acclimation*. Laboratory raised animals may be tested at any time. *Daphnia* collected in the field should be reared through two generations before commencing chronic studies.

12. *Food and feeding*. A suspension of food should be fed continuously. We recommend adding a suspension of food containing powdered dried grass or alfalfa leaves and trout fry granules. The amount to add will depend on the organic enrichment of the water being tested. The food suspension is prepared by weighing out 0.5 grams of powdered dried grass and 10 grams of enriched trout fry granules. These are added to 250 ml of lake or river water and mixed vigorously in a blender for five minutes. The suspension is then strained through stainless steel screen (105 mesh with 0.165 inch openings); and an additional 50 ml of water is used to rinse the blender and added to the above suspension. The food thus prepared is stored in a refrigerator and thoroughly mixed each time an aliquot is withdrawn. A mariotte bottle with a mechanical stirrer is used to deliver food to the diluter; the food suspension is renewed every three days.

13. *Testing methods*. It is recommended that young daphnids, 12 ± 12 hours old be placed in test chambers and subjected to test conditions for three weeks. Daphnids should be transferred with an eye dropper into cleaner containers each week. Survival of the initial animals added should be noted after one week, two weeks, and three weeks. Reproduction should be noted by counting the young produced each week; the young should be counted and discarded each time the initial animals are transferred and at the end of each experiment. It is recommended that five daphnids be placed in 2 liters of water in battery jars. Four battery jars should be used with a total of 20 animals for each experimental condition for each test. The battery jars must be randomly distributed on a shelf.

14. *Concentrations*. The number of concentrations to be tested should be from four to eight depending on the toxicant and the effects to the initial animals as well as to the effects on reproduction. Initial concentrations tested should be designed to bracket published results (i.e., above and below); however, as daphnids have not been tested on a chronic basis to many toxicants, experiments often have to be repeated before arriving at "no effect" levels. After delineating the concentrations to be tested, three successful tests should be run for each toxicant in which sixty animals would be tested for each concentration. Adult survival in the control water must be 70% or more after three weeks for a test to be valid.

15. *Statistical evaluations*. Statistical evaluations of results may be made using an Analysis of Variance on the young produced during three weeks of exposure by combining three tests and determining the sources of variation due to: Experiments, treatments and experiments X treatments. Dunnett's Test (P=.05) is recommended to find the concentrations significantly lower than the control. For adult survival either the method of Litchfield and Wilcoxon (1949) or that given in American Public Health Ass'n "Standard Methods" may be used.

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Mount, D. I. and W. D. Brungs. 1967. A simplified dosing apparatus for fish toxicology studies. *Water Res.* 1:21–29.

EXHIBIT 3

CULTURING METHODS FOR DAPHNIA AND CERTAIN OTHER CLADOCERANS BY KENNETH E. BIESINGER. EPA NATIONAL WATER QUALITY LABORATORY, DULUTH, MINNESOTA

Cladocerans are cultured in lake water[1] (strained through stainless steel screen having 105 mesh with 0.165 openings), in a constant temperature room at 18.5±1°C using a 16 hr automatically controlled photoperiod. Duro-Test Optima and Gro-Lux fluorescent bulbs are used to provide a light intensity of ~115 ft c at the air-water interface. Approximately 5–10 daphnids of mixed age (young and adults) are transferred weekly (using a widemouth medicine dropper) into each liter of water which has been allowed to equilibrate to room temperature and pressure for at least 24 hrs. The animals are fed one ml food[2] per liter of water when transferred and again after three or four days. *For Daphnia magna*, D. *pulicaria* (pulex) and other large cladocerans, glass jars holding ~3 liters of water are used; for smaller cladocerans, glass jars holding from 1–2 liters of water are used. For each species currently being used for tests, from 10–20 glass jars are maintained from which some animals (above) are transferred weekly into clean containers. Some week old cultures are kept an additional week as spare brood stocks and then discarded, although animals from these are not used for tests. By keeping cladocerans in the growth phase at all times overcrowding, male production, ephippia (resting eggs) formation, and "crashes" are prevented. Transferring the animals weekly into clean solutions also helps control excessive bacteria and algae growths.

Twenty-four hours before setting up a test, from 20–40 adult cladocerans with large eggs are transferred from culture jars into other jars containing food and water (1–2 liters). The young produced during the following 24 hr time period are used for starting all tests by transferring them into control and test solutions in intermediate containers (50 ml beakers) and then transferring them again into the same control and test solutions in containers to be used for tests.

For routine tests either *D. magna* or *D. pulicaria* (often misidentified as *D. pulex*) are recommended. In addition to chronic tests (attached), two to four day acute tests are recommended. Acute tests may be evaluated using the Litchfield and Wilcoxon (1949) method for 50% lethal concentrations (LC-50's), or "Standard Methods" for median tolerance limits (TLM's).

Footnotes

[1] Well, pond, or river water may also be used. Dechlorinated tap water is not recommended; a concentration of <1 µg/l chlorine may result in death to daphnids.

[2] The food suspension is prepared by weighing out 0.5 grams of Cerophyll and 10 grams of enriched trout fry (Glencoe Mills) granules. These are added to 250 ml of lake, well, or river water and mixed vigorously in a blender for five minutes. The suspension is then strained through stainless steel screen (105 mesh with 0.165 inch openings) forcing the smaller particles through with a spatula; and an additional 50 ml of water is used to rinse the blender and added to the above suspension. The food thus prepared is stored in a refrigerator for up to one week and thoroughly mixed each time an aliquot is withdrawn.

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American Public Health Association, Inc. 1965. Standard methods for the examination of water and wastewater, 12th Ed. Am. Public Health Assoc., New York. 769 pp.

Litchfield, J. T., Jr. and F. Wilcoxon, 1949. A simplified method of evaluating dose-effect experiments. *J. Pharmacol. Exp. Ther.* 96: 99–113.

EXHIBIT 4

TENTATIVE CHRONIC BIOASSAY PROCEDURE FOR THE MIDGE "CHIRONOMUS TENTANS" BY S. KROGH DERR. BIONOMICS, EG AND G, INC., WAREHAM, MASSACHUSETTS

MARCH, 1974.

A. *Physical Exposure Systems.*

1. Use a proportional diluter for the chronic exposure system as described by Mount and Brungs (1967) and modified to deliver 500 ml of experimental water per dilution cycle. A container is necessary to promote mixing of the toxicant solutions before delivery to the test aquaria. Separate delivery tubes should lead from the toxicant mixing cells to the respective experimental chambers.

2. *Experimental Chambers.* Use true duplicate aquaria for each toxicant concentration. Placement of each aquarium should be determined by a stratified random assignment. Experimental aquaria should be constructed with all glass and be of such dimension to hold 3 liters of water. Adequate screening (aluminum) should be placed over each aquarium to retain emergent adults. The flow rate to each chamber should be maintained at a rate equal to 3 to 5 tank volumes every 24 hours.

3. *Temperature.* Diluent toxicant water in the aquaria should be maintained at 22± 1°C and never be allowed to exceed 25°C.

4. Dissolved oxygen should be above 40–50% saturation.

5. *Photoperiod.* Maintain exposure day lengths at a 12-hour light-dark cycle. Use a combination of Gro-Lux (wide-spectrum) and Durotest (optima FS) lights providing an intensity at the water surface of 70–140 foot candles illumination.

B. *Biological Systems.*

1. *Holding.* Maintain all experimental animals in a 40–60 l all-glass aquarium. The holding chamber should be adequately supplied with a defined substrate and aerated.

2. *Food-Defined Substrate.* A substrate of homogenized paper hand towel (Nibroc Co.) and high protein poultry or trout ration is required. The substrate is prepared by homogenizing 50 g of hand towel and 5 g of the selected food with enough water to cover the mixture in a Waring Blendor. The substrate is then placed into each experimental aquarium at a depth of ½ inch.

3. *Analytical Chemistry.* Concentration of toxicant will be measured at least weekly in each experimental unit, by appropriate analytical method to determine actual exposure levels.

4. *Initiation of Chronic Test.* (First Generation). Place one hundred eggs from 1 egg mass into an egg cup suspended in each experimental aquarium (12 aquaria total). After a 3-day period record the percent hatchability and pipette the first instar larvae onto the defined substrate.[1] Allow the larvae to develop, pupate and emerge in the same time period as the controls; any delayed or retarded developmental time in any of the experimental aquaria would be ascribed to treatment. Collect egg masses from those treatments that realized egg deposition in the same time period as the controls and initiation of the second generation in the same manner as the first. Additional food-enriched substrate should be added to test aquaria after first generation emergence occurs.

EXPERIMENTAL INDICES INCLUDE

FIRST GENERATION

1. Percent hatch
2. Number of pupae
3. Number of adults
4. Reproduction and egg deposition
5. Developmental time of larvae when compared to controls

SECOND GENERATION

6. Percent hatch
7. Number of pupae
8. Number of emergent adults
9. Developmental time of larvae when compared to controls

SELECTED REFERENCES

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EXHIBIT 5

ENTIRE LIFE-CYCLE BIOASSAY USING SHEEPSHEAD MINNOWS (CYPRINODON VARIEGATUS)* BY DAVID J. HANSEN AND STEVEN C. SCHIMMEL. EPA, GULF BREEZE ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FLORIDA

A. *Purpose.* The purpose of this procedure is to provide a method of determining the effect of a material on survival of sheepshead minnow embryos and fry, their growth to adulthood, and reproductive success. Reproductive success is measured by monitoring the ability of pairs of fish to spawn naturally, their fecundity, fertilization success and survival of embryos and fry.

B. *Physical Systems*—1. *Water source.* a. The source of test water should be natural seawater with salinity ≥ 15 ‰. It may be acceptable to add artificial sea salts to achieve a salinity of ≥ 15 ‰ using freshwater or natural seawater with a salinity of < 15 ‰.

b. Seawater must be filtered to remove particles 15µ and larger, but filtration should not affect the chemical composition of the natural seawater. Filtration must remove planktonic larvae which could prey upon eggs, fry and juvenile fish in the chronic bioassay.

c. Any water source proposed must be analyzed for possible pollutants (e.g., pesticides, PCBs and heavy metals). Special determinations should be made for those toxicants being investigated.

2. *Dosing apparatus.* A number of apparatus would be acceptable for this bioassay including those of Mount and Brungs, 1967; Hansen et al., 1971; Hansen et al., 1974 or Schimmel et al., 1975.

3. *Toxicant mixing.* A mixing chamber is necessary to assure adequate mixing of the test material. Aeration should not be used for mixing.

4. *Duplicates.* True duplicates should be used for each concentration in all tests (no water connection between aquaria). Aquaria location should be by random selection.

5. *Aquaria.* Each duplicate glass aquarium should be large enough to allow for growth and reproduction. Aquaria measuring 30x90x 30 cm high and having a water depth of 15 cm have been used successfully.

6. *Embryo and fry chambers.* a. Embryo and fry chambers should be constructed to allow for adequate exchange of water and to insure that the proper quantity of material is entering the chambers. Embryo chambers (incubation cups) can be constructed from 113 g., 5 cm, OD round glass or beakers with the bottoms cut off. The bottoms are replaced with 40 mesh stainless steel or nylon screening. Chambers are hung on an oscillating rocker arm apparatus that is driven by a 1–5 rpm electric motor (Mount, 1968). These chambers must be brushed daily to prevent clogging. Chambers may also be constructed from Petri dishes to which nylon or stainless steel screen is glued (Hansen *et al.*, 1974).

b. Embryo and fry chambers should be designed so that the water can be drained down to 2.5 cm (1 inch) in order to facilitate growth measurements of fry.

c. Embryo and fry chambers, volume ≥400 ml, may be supplied test water by (1) separate delivery tubes from the mixing chamber, (2) splitting the flow from the aquaria or (3) egg cups on a "rocker" arm.

7. *Flow rate.* a. Flow rates to each duplicate aquaria should be great enough to (1) provide 90% replacement in 8–12 hours (Sprague, 1969); (2) maintain dissolved oxygen, 60% saturation; and (3) maintain the toxicant concentration.

b. The test system should be equipped with an alarm system to insure continuation of water and toxicant flow.

8. *Photoperiod.* A 16-hour light/8-hour dark cycle should be maintained throughout the test. It may be desirable to control lights by a timing switch (Drummond and Dawson, 1970).

9. *Temperature.* Test temperature should be maintained at 30°C (±1 C). Temperatures can be maintained by (1) preheating the diluent water to the prescribed temperature, and/or (2) placing the test aquaria in a temperature controlled water bath.

10. *Cleaning.* All aquaria should be cleaned whenever organic material builds up. Aquaria should be brushed down and siphoned to remove accumulated material. To reduce stress, fish can be left in aquaria. However, care

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[1] After pipetting the first instar larvae onto the substrate, take exceptional precautionary measures not to disturb the larvae after they have constructed their respective tubes.

*This procedure has been used at the Gulf Breeze Environmental Research Laboratory. This is a preliminary draft. It has not been formally reviewed by this laboratory and is being circulated for information only.

should be exercised in cleaning to prevent loss or damage to the fry, juveniles or adults. Embryo and fry chambers may need to be cleaned frequently or replaced when screens clog or organic material collects. Special care is required to prevent injury to fry.

11. *Spawning chambers.* Chambers should be constructed of either glass or #316 stainless steel. Chambers should be large enough to allow the male to establish a territory and the female to escape attacks by the male. Chambers measuring 13x30x15 cm high, with a large mesh screen (1 cm^2) attached 1 cm above the bottom to enable eggs to pass through, have been used successfully. The mesh screen on the bottom reduces predation by the parents on the eggs.

12. *Disturbance.* All test chambers containing fish should be shielded from excessive outside disturbances. Tanks should be shielded from all outside light sources that would interfere with the photoperiod.

13. *Concentrations.* a. A minimum of 5 concentrations of toxicant and a control, all duplicated, should be utilized in all acute and chronic tests.

b. Concentrations selected for chronic toxicity experiments should be based on results of acute flow-through bioassays. Concentrations should be selected so that at least one will adversely affect some life stage of the sheepshead minnow and one will not affect any stage.

c. Chemical analyses should be made of the toxicant to be tested, of the water during this test and of the fish during and at the conclusion of the test. At a minimum, the concentration of toxicant in the test water of each test concentration should be analyzed weekly. Each life stage (eggs, fry, juvenile and adult fish) from each toxicant concentration should be analyzed during the test. Whole adult fish, flesh, eggs or ovaries should be analyzed.

14. *Acute tests.* Acute flow-through bioassays should be conducted prior to initiation of any chronic test (Sprague, 1969). It is desirable for these tests to be on at least two different age classes (e.g., fry, juveniles or adults).

C. *Biological Systems*—1. *Source of adult fish.* Adult fish should be obtained from the same source, either from wild population or suitable culture laboratories. They should be held in flowing 30° C sea water of $\geqq 15$ ‰ salinity for a minimum of two weeks before obtaining eggs.

2. *Obtaining eggs from adult fish.* To obtain a sufficient number of eggs to begin a chronic exposure, two methods may be employed. (1) Natural spawning from laboratory stocks. (2) Artificial inducement, where adult female egg production is stimulated by injection of human gonadotrophic hormone and fertilized with sperm excised from males. (Schimmel et al., 1974). The former may be preferable.

3. *Beginning the test.* Two groups of fifty fertilized eggs are placed in two or more separate embryo and fry chambers in each duplicate aquarium. Survival of embryos and fry (which constitute the parental stock, F_1) are to be checked and recorded daily. After 4 weeks fish are reduced to 25 per duplicate aquarium. This should provide enough fish so that at least five pairs of adults will be available in each replicate aquarium for spawning.

4. *Food.* a. Fry should be fed live brine shrimp nauplii (*Artemia salina*) two or more times daily for about 2 weeks. (Do not use frozen nauplii.) Automatic feeders are recommended (Schimmel and Hansen, 1975). After 2 weeks, supplement with dry trout pellets (e.g. Oregon Moist) or dry mollie flakes (e.g. Biorell) for 2 additional weeks.

b. Juveniles and adults can be fed twice daily dry food supplemented with frozen adult brine shrimp. Each batch of food should be checked for pesticides (DDT, dieldrin, endrin, etc.). In addition, chemical analysis should also include chemicals in the material to be tested.

5. *Disease.* Disease outbreaks should be handled according to their nature with each aquarium being treated similarly, even though disease is not evident in all aquaria. All treatments should be kept to the minimum and recorded as to type, amount and frequency.

6. *Measuring fish.* A sample of fish of the F_1 generation should be measured at one day post hatch, 4 weeks, 8 weeks, and at adult termination. In addition, fish are to be weighed at week 4 and termination. Larval (F_2) fish are to be measured at 1 day post-hatch and weighed and measured at week 4 (termination). Suggested techniques for measuring fish include the photographic method outlined by McKim and Benoit (1971), or placing fish in a beaker or petri dishes containing .63 cm (¼ inch) of water on a photocopier.

7. *Thinning.* At 28 days post-hatch, the F_1 larvae should be randomly reduced to 25 fish per duplicate aquaria.

8. *Spawning chambers.* As mature adults (F_1) begin courtship (indicated by sexual dimorphism, territoriality, aggressive behavior and courtship by the male), separate pairs should be placed in individual spawning chambers in the aquaria. Pairs should be left in the chambers until a sufficient numbr of eggs have been collected to insure statistical comparisons of fecundity, fertility, and survival of embryos and fry can be made.

9. *Removing eggs.* a. All eggs should be removed at a fixed time each day so the fish are not overly disturbed and disruption of spawning activity will not occur.

b. Daily records of spawnings, egg numbers, and egg fertility must be kept. All eggs must be removed daily, examined for fertility, and then used for survival studies or residue analyses or discarded. Each pair should be observed daily for a minimum of two weeks.

10. *Egg incubation.* a. A series of groups of 50 fertile eggs should be collected and incubated from adults in each aquarium. Preferably, they should be obtained from one daily spawn from each of the five spawning pairs. If necessary, because of small spawns, eggs may be collected over an extended period in order to obtain 50 eggs.

b. If no spawning occurs in the higher concentration, eggs should be transferred from control spawns and incubated in the higher concentration to gain additional information.

c. Groups of fifty eggs are placed in two or more egg cups. Survival of embryos, time required to hatch, hatching success, and survival of fry for 4 weeks will be determined and recorded.

d. Additional groups of 50 eggs from fish from contaminated aquaria should be placed in control aquaria to determine if they contain chemicals toxic to embryos or fry.

e. Remaining eggs should be analyzed for toxicant residue.

11. *F_2 embryos and fry.* Survival of embryos and fry will be recorded daily for 4 weeks. Fry are to be measured on 1 day post hatch and weighed and measured on week 4 (termination). Daily records should be kept on mortalities, development of abnormalities and behavioral changes.

12. *Termination of adults.* a. With many chronic procedures utilizing other fishes, termination of the test is considered the time when no spawning activity has occurred over a 2 week interval. For the sheepshead minnow, however, termination should occur after 2 or more weeks of spawning. Enough spawns have to occur to statistically predict the effect of the toxicant that is tested. It is our experience that most fish will spawn readily and almost daily unless sick, affected by a pollutant or immature.

b. Adult fish should be weighed, measured, sexed and retained for residue analysis.

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TENTATIVE BIOLOGICAL UPTAKE AND FOOD CHAIN TRANSFER TEST METHODS

Johnson, B. T., and R. A. Schoettger. 1974. A biological model for estimating the uptake, transfer, and degradation of xenobiotics in an aquatic food chain. Fish-Pesticide Research Laboratory, Columbia, Mo. (Exhibit 1).

This method deals with food chain transferral of pesticides.

Macek, K. J., M. E. Barrows and B. H. Sleight, III. 1974. Bioconcentration of ^{14}C-pesticide by bluegill sunfish during continuous aqueous exposure.

Only the introduction and methodology sections of this paper are currently available. The method is currently being revised in a more complete form and will be provided when available. Copies of this methodology in present form may be obtained from Dr. Kenneth J. Macek, Bionomics, EG and G Environmental Consultants, Wareham, Massachusetts.

Exhibit 1

A BIOLOGICAL MODEL FOR ESTIMATING THE UPTAKE, TRANSFER, AND DEGRADATION OF XENOBIOTICS IN AN AQUATIC FOOD CHAIN

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Introduction

The protocol described here is designed to investigate the uptake, transfer, and degradation of xenobiotics in a simple food chain representing three aquatic trophic levels. The model food chain is, in essence, a simple means to estimate under controlled conditions, the movement of an organic synthetic chemical (i.e. a "foreign" molecule or xenobiotic) by certain representative trophic levels of a natural aquatic ecosystem. The model conforms to selected criteria; it is inexpensive, simple to maintain, reproducible, ecologically relevant and produces clearly definable data. Each trophic level must be evaluated if meaningful information concerning xenobiotic uptake is to be derived from the model at the vertebrate trophic level. We wish to know how much of it is taken up. How much is retained? What is the quantity and quality of the residue? What is the uptake rate? How much can be moved via natural food and direct water uptake? What are the maximums of all these?

This model is compartmentalized or modular as compared with the microcosm system of Metcalf and others (Metcalf *et al.*, 1971; Reinert 1972; Isensee *et al.*, 1973; Matsumura and Benezet 1973). The warm water (>16C) food chain consists of three trophic levels with fish representing the top level: (1) microorganisms (yeast, protozoa, bacteria or algae) ➤ (2) filter feeder (daphnid) ➤ (3) fish (bluegill). Potentially, information may be drawn from five points within the model system. For example, in the warm water food chain, data may be gathered on uptake along several routes from water to microorganisms, microorganisms to daphnids, water to daphnids, daphnids to fish, and water to fish. Also the simultaneous use of different water and food combinations produces a number of possible permutations. One may use part or all of the food chain to evaluate potential uptake of the xenobiotic. The three segments are never tested together in the same container because of the difficulty in controlling the feeding rates (food chain transfer) between trophic levels.

Both quantitative and qualitative information are obtained from the food chain. One can estimate from the model the rate of uptake of a chemical by direct uptake from water (respiratory structures and body surface) or by uptake from residues in natural food, and also determine the chemical changes in the residue caused by abiotic or biotic systems.

Concentration Selection and Relevancy of Exposure

The concentration(s) of the xenobiotic under investigation should be relevant to potential use of the information for registration or environmental impact statement reviews. Select the concentrations for food chain studies on the basis of acute toxicity, recommended use rates, or information on probable concentrations likely to occur in aquatic ecosystems. Acute toxicity data, or LC50 (lethal concentration) values probably represent the best information at present on which to base the selection of concentrations. LC50 data are usually readily available and reproducible within certain confidence limits. Select the LC50 that represents the least tolerant member of the food chain model. Concentrations of the xenobiotic used in the uptake studies should not exceed the LC50, even though an uptake plateau or equilibrium level is reached in less than the 48 or 96-hr duration of standard acute toxicity tests. Use a concentration between 1/10 and 1/1000 of the LC50, depending on the slope of the toxicity curve. For example, if the daphnids are the most sensitive species to the xenobiotic and have a 48-hr EC50 of 1.0 μg/1, we suggest use of a test concentration between 0.1 μg and 0.001 μg/1 for the model. However, other sublethal concentrations are preferable if they can be estimated from anticipated use rate, or from a concentration projected or measured in aquatic ecosystems.

Chemical Analysis

^{14}C-LABELED COMPOUNDS

Chemical analyses used in measuring uptake and degradation require sensitivity sufficient to detect and quantify nanogram amounts. Therefore, we recommend radiolabeled compounds and radiometric assay consisting of liquid scintillation spectrometry and autoradiography of thin-layer chromatograms. The radioactive material, preferably ^{14}C-labeled, should occupy the most stable portion of the molecule. Efficiency of the radiometric system is based on comparison with a spiked control. Quench curves should be plotted with different microbes, daphnids, and fish.

XENOBIOTIC SEPARATION AND IDENTIFICATION

Extraction. Take 100 mg of either microorganisms or daphnids, or 500–1500 mg of fish and homogenize in a tissue grinder with 5–10 ml of a selected extraction solvent (Hesselberg and Johnson, 1972). Pour the homogenate into a small porcelain evaporation dish and blend with anhydrous Na_2SO_4 (1: 4 w/w) to form a free flowing dry mixture. Pour the mixture into a 20 x 400 mm chromatography column plugged with a small piece of glass wool at the bottom of the column and lightly pack the column with the Na_2SO_4 mixture. Wash the grinding tube with the extracting solvent and add a sufficient amount of solvent to the chromatography column reservoir to insure maximum extraction efficiency. Concentrate the column effluent by evaporation to ca 1.0 ml in a porcelain evaporation dish with heat and a gentle stream of nitrogen under a fume hood. Pour the concentrated solution into a 5 ml centrifuge tube and carefully evaporate to 0.1 ml.

Thin-layer Chromatography. Spot the total sample on an appropriate thin-layer plate with a 10 μl Hamilton syringe and develop the plate in an appropriate solvent system. The extraction solvent, clean-up procedure, pH adjustment to extract polar degradation product, the type thin-layer plate and the developing tlc solvent system are dictated by the chemical nature of the xenobiotic. Authentic standards of the xenobiotic, both labeled and non-labeled, are co-chromatographed with the experimental extract. Use a tlc plate containing a fluorescent indicator and locate the compounds by viewing under short wave ultraviolet light (2537A).

Autoradiography. Use no-screen medical x-ray film to locate and visualize the radioactive material by autoradiography. Expose the x-ray film for 7 days to the tlc plate. Identify the radiogram by superimposing the film on the tlc plate. Quantify separated radiolabeled material by carefully scraping silica gel from the specific radioactive R_f area into a scintillation vial containing 15 ml of toluene: fluor (Fluoralloy®) and assay the mixture with a liquid scintillation counter. Correct all results for background and quench.

Analysis of Results. Report all samples in terms of degradability of xenobiotic, percentage of degradation and chromatographic identification of degradation products. Indicate the extraction solvent, extraction efficiency and the tlc developing system.

SAMPLING

All samples are taken in replicates of 3 to 5 and expressed as mean values ± standard error; however, confidence interval reference and the chemical nature of the xenobiotic may necessitate a larger sample size. Data are not utilized when mortality within the experimental group exceeds that in the control by 5%.

WATER QUALITY

Water should be uncontaminated and constant quality and should meet the following specifications:

1. Suspend solids, 20 mg/1;
2. TOC or COD, 10 mg/1;
3. Un-ionized ammona, 20 $\mu g/1$;
4. Residual chlorine, 3 $\mu g/1$;
5. Total organophosphorus pesticides, 50 ng/1;
6. Total organochlorine pesticides plus PCB's, 50 ng/1.

Water is considered to be constant quality if the monthly ranges of the hardness, alkalinity, specific conductance TOC or COD, and salinity are less than 10% of the respective averages and if the range of pH is less than 0.4 unit. Alternative freshwater should be obtained from an uncontaminated well or spring if possible; only as a last resort should a dechlorinated water be used. If dechlorinated water is used, it must be shown that either first instar daphnids can survive in it unfed for 48 hours or that residual chlorine must be measured below 3 $\mu g/l$ at the beginning of the test (Stephan, et al., 1975).

UPTAKE FROM WATER BY MICROORGANISMS

DETERMINATION OF EQUILIBRIUM CONCENTRATION

Test Organism: Yeast (*Saccharomyces cerevisiae*)

Culture Preparation. Accurately weigh 1.0 g of dried commercial grade baker's yeast and pour it directly into a 2 l beaker containing 1 l of water warmed to ca 48C. Place the yeast suspension on a magnetic stirrer and mix slowly for 1 hr.

Xenobiotic Inoculation and Incubation. After 1 h incubation, prepare yeast cell dilutions of 0.1 mg/ml, 0.25 mg/ml, 0.5 mg/ml, and 1 mg/ml in triplicate 100-ml volumes and place in 250-ml Erlenmeyer flasks. Add the ^{14}C-labeled xenibiotic at the pre-selected concentration directly to each dilution of the yeast suspension. For best results, the total counts per minute (cpm) for the specific radioactive substance used in the uptake segment should exceed 1000 cpm for each sample. Water is the carrier solvent of choice. If a carrier solvent other than water is necessary to introduce the xenobiotic, it should not exceed 0.1% of the total volume of the yeast suspension. The carrier solvent and amount used must be clearly defined in the final report. Incubate the yeast suspensions in the ^{14}C-xenobiotic solution for 0.5, 1, 4, 8, and 24 h in a water bath shaker maintained at 20±1°C. The yeast cells should be moderately agitated to keep them in suspension.

Residue Analysis—Yeast. After incubation for various intervals, vigorously shake the yeast suspension and accurately pipette 50.0 ml of the treated yeast cells from the 250 ml exposure flask for residue determination. Remove the yeast cells from the treatment solution by centrifugation or filtration. Any centrifuge that can exert ca 10,000 × g force is satisfactory. Filtration can be accomplished with a Millipore® type apparatus with a 0.45 μ filter. Wash the cells once by resuspending them in 50 ml of clean water and reconcentrate them by centrifugation or filtration. Immediately add 6 ml of Triton-X 100®:Fluoralloy® (2:3 v/v) to the cells and stir vigorously with a vortex mixer. Pour the yeast suspension directly into a liquid scintillation vial. Wash any remaining cells from the centrifuge tube and filter into the vial with 9 ml of Fluoralloy®-toluene mixture. Place the vial directly into a liquid scintillation counter with an internal standard. Prepare a control sample with untreated yeast cells and the emulsifier-fluor to correct for background radiation. Correct for quench by preparing a ^{14}C-spiked yeast sample at a concentration similar to the one used for the uptake experiments. Convert corrected cpm unit/sample into weight unit of the ^{14}C-xenobiotic by dividing the corrected known specific activity of the compound.

Analysis of Results. Report residue on the xenobiotic yeast cells (wet) (w/w) (convert all dry yeast weights [i.e. the beginning yeast weight] to wet weights; yeast contain ca 50–60% water). All data should represent true replications of samples. Report yeast cell residues as mean ± standard error. Prepare a chart and report the total cell residue for each biomass-incubation concentration. Indicate whether uptake reaches an apparent equilibrium concentration between the yeast cell and the xenobiotic. State the specific time and biomass. Select the biomass and incubation period with the highest residue in the daphnid feeding experiment to demonstrate the maximum movement of the xenobiotic by yeast cells. Obtain the uptake factor (UF) for this value. Calculate this value by dividing the concentration of the *original* water concentration introduced into the culture by the final total cell residue (total cell residue/original H_2O concentration). For example, if the H_2O concentration was 100 ng/l (ng/kg) and the final yeast residue was 10 ng/mg, the UF would be 100,000 times (See Water Uptake Index).

UPTAKE FROM WATER BY DAPHNIDS

DETERMINATION OF EQUILIBRIUM CONCENTRATION IN DAPHNIDS

Test Organism: *Daphnia magna*

Culture. The filter-feeding cladoceran *Daphnia magna* Strauss is easily maintained in the laboratory in large vats (>50 gal) or in smaller aquaria (<10 gal) feeding only on yeast cell suspensions. The stock culture should be healthy, vigorous and reproducing parthenogenetic with no signs of ephippial eggs.

When collecting daphnids from water avoid unnecessary handling and injury to these fragile organisms by constructing a small hand net. We recommend using small fish net, remove the netting and replace it with #20 wire mesh (or equivalent). Secure the mesh to the outer net rim with builder's sealant (Dow Corning® 781). The daphnids are easily collected on the mesh and then transferred to the experimental chamber or filter pad.

Experimental Chamber. The daphnids are netted from the stock culture, washed with clean yeast-free water, collected on a Millipore®-filter holder containing a No. 2 Whatman-filter paper to remove the wash water and quickly weighed on an analytical balance to the nearest 0.1 mg. One gram (wet weight) of the daphnids are quickly placed in a 2 l all glass aquarium containing 1 l of water. The daphnid sample should contain various ages of instar development.

The aquarium contains a center drain and standpipe with a tubular glass sheath. The glass sheath is notched at the bottom to channel water from the bottom of the aquarium. This drainage system insures better mixing of the introduced chemical and more efficient removal of waste products. Temperature is maintained at a constant 20±1 C. Set photoperiodicity for a 12 hr cycle with fluorescent lighting. All organisms are acclimated to the same water source and temperature used in the uptake experiments. Daphnids introduced into the experimental chamber are acclimated overnight. If the organisms are not freely swimming about the aquarium or if mortality exceeds 5% of the total daphnid population, the experiment should be terminated. The biomass:water volume should not exceed 1 mg daphnid wet weight/1 l of water.

Xenobiotic Exposure. To insure a relative constant water concentration of the preselected xenobiotic, use a metering pump or a single cell diluter (Chandler *et al.*, 1974) to introduce an intermittent flow at a rate of 2 to 5 ml/min. Excessive flow rate of water in a small aquarium is harmful to the daphnids. The daphnids are not fed during the uptake experiment. Terminate the experiment after 48 h to preclude potential nutritional stress within the culture.

Residue Analysis—Daphnids. Determine total body and water residues at 1, 4, 8, 24, and 48 h to ascertain uptake kinetics. Remove the daphnids from the experimental chamber, wash them with clean water, collect them on a Millipore® filter (No. 1 Whatman filter 4.25 cm) and weigh wet. Homogenize the sample in a tissue grinder with a Teflon®-coated tissue grinder and 6 ml of Triton-X 100® and Fluoralloy® (2:3 v/v emulsifier:fluor). Pour the homogenate into a scintillation vial, washing the grinding vessel with 9 ml of the fluor. Place the vial in a liquid scintillation counter and determine counts per minute present in the sample. Quench and background radiation corrections must be made before calculating specific quantities of xenobiotic present. Accuracy data derived from spiked daphnid samples should also be included with final liquid scintillation analyses. After these appropriate corrections are made, report all residues as ratio of xenobiotic to whole body wet weight of daphnids (w/w).

Residue Analysis—Water. For water residue analysis use a similar experimental chamber without daphnids, but one that is receiving the same xenobiotic concentration and flow rate as the one containing the test organisms. *Do not* use the experimental chamber containing the daphnids because they tend to give a misleading low value due to the uptake by the daphnids. If this residue value must be used, it should be clearly indicated when describing the uptake factor. Take a water sample of sufficient volume to give a minimum of 100 cpm (corrected) per counting vial. Water samples are monitored during the uptake experiment at each daphnid residue sampling interval. Take all water samples in triplicate.

Each water sample is extracted with the most appropriate solvent for that specific chemical. It is strongly advisable to run ^{14}C spiked samples to determine extraction efficiency for the specific xenobiotic-solvent combination. Use an appropriate size separatory funnel which permits good solvent: water partitioning. Avoid vigorous shaking that produces unmanageable emulsions. After extraction, carefully evaporate the solvent to approximately 1 ml in a porcelain evaporation dish under a fume hood. The type of solvent will dictate whether heat or nitrogen is necessary for evaporation. In some instances a rotary-vacuum evaporator may be necessary to reduce the solvent volume. Wash the concentrated solvent directly into a liquid scintillation vial with 15 ml Fluoralloy®-

toluene solution. To reduce phosphorescence store the samples overnight in a dark place prior to placing in a liquid scintillation counter for assay. Correct counts for quench and background radiation with control ^{14}C spiked samples. Water extraction efficiency data should be presented with final residue values. Caution: Certain common solvents used for chemical extraction cannot be used in liquid scintillation spectrometry because of excessive quenching. The investigator is advised to check a manual for preparations of samples for liquid scintillation counting prior to making water extractions.

Analysis of Results. Take all samples in at least triplicate and on a weight/weight basis. All daphnid residues are based on wet weight only. Plot uptake factors (UF daphnid residue/water concentration) for each interval from 1 h to 72 h. Determine the possible plateau concentration for the daphnid at the experimental concentration.

TRANSFER VIA NATURAL FOOD

MICROORGANISMS—FILTER-FEEDER

Organism: Yeast (*Saccharomyces cerevisiae*)

Culture. (See Uptake from Water—Daphnids)

Xenobiotic Exposure. Accurately weigh 2.0 grams of daphnids (wet) and place them in at 2 l glass aquarium containing 1 l of water. The daphnid sample should contain a random collection of various ages of instar development. The chamber is similar to the container used to determine direct uptake of xenobiotic from water by daphnids (Water Uptake—Daphnid). Maintain the daphnids at 20±1°C throughout the feeding exercise. Do not subject the daphnids to any drastic water or temperature difference from the stock culture during the feeding for 2 days before beginning the experiment.

Prepare a yeast culture containing a residue of at least 80% of the previously determined equilibrium concentration (see yeast uptake protocol). Use a 3 l Erlenmeyer flask and prepare a 2 l solution containing a 250 μg/ml concentration of treated yeast. Place the flask on a magnetic stirrer to keep the yeast cells in suspension and attach a metering pump. Pump the treated yeast cells directly into the daphnids at a rate of 1 ml/min. After 24 h, prepare another flask containing a similar concentration of treated yeast cells and replace the orginal flask with this batch for the final 24 hr feeding period. We found that by following this procedure it is much easier to monitor the residue of treated yeast cells during the last 24 h interval.

Residue Analysis. Remove three 50-ml samples from both the 24 h and 48 h yeast batch and determine the total cell residue of the xenobiotic passed via the microbial food route. Yeast residues are determined by the liquid scintillation method (See Uptake from Water—Microorganisms—Residue).

After 48 h remove all the daphnids from the feeding chamber. Wash the daphnids with clean water to remove any adhering yeast cells. Take at least five replicate samples of daphnids from each experimental chamber. Each sample should contain at least 100 mg of daphnids (wet weight) for residue analysis. Each feeding experiment should be set up in at least duplicate.

Analysis of Results. Report all residue data on a wet weight basis. Calculate and report the transfer rate of the xenobiotic from yeast to daphnids on a percentage or ratio basis (total daphnid residue/total yeast residue) (Also see Food Transfer Index).

FILTER-FEEDER—FISH

Organisms: Daphnids (*Daphnia magna*) Bluegill (*Lepomis macrochirus*)

Natural Food Preparation. Daphnids should contain a residue of the xenobiotic at concentrations at least 80% of the equilibrium concentration (previously determined in the Daphnid-Uptake Section). Generally the ^{14}C-labeled xenobiotic may be conserved by introducing the radioactive material into the daphnids in a static system, instead of a flow-through apparatus. Take 2.0 g (wet weight) of daphnids from the stock culture by screening and place them into a 2 l beaker containing 1 l of water. Add the chemical directly to the beaker container 1 l of water and expose the daphnids overnight. The concentration of the xenobiotic employed usually is higher than those used to determine the equilibrium concentration. Start with a water concentration about five times that used in the plateau experiment. In most cases a few trial tests will be sufficient to determine when 80% of the equilibrium concentration is reached. If a carrier solvent is necessary to introduce the xenobiotic to the daphnid, it should not exceed 0.1% of the total volume of the water containing the daphnids. Also, the static concentration selected for exposing the food source should not exceed the LC50 value of the xenobiotic for the daphnids. The treated daphnids are removed from the exposure solution by filtration. Use a Millipore® stainless-steel filter holder with a 4.25 cm No. 2 Whatman filter paper. The wet, live organisms are quickly weighed to the nearest 0.1 mg. Avoid prolonged filtering and air-drying to reduce potential injury to the daphnids prior to feeding them to fish. The number of daphnids needed for each feeding is estimated from the composite fish weight of each group. Feed the bluegill an amount of daphnids equivalent to 5 to 10% of the fish weight per day. Other rations may be selected, but the total amount of live food given each group per day must be clearly delineated. After the treated daphnids have been weighed, divide them between each group of fish on a 5 to 10% per fish weight per day. For example, if the fish in group 1 weigh 3500 mg (composite weight) and those in group 2 weigh 3700 mg, the daphnid ratio are 350 mg and 370 mg, respectively. Normally, the daphnids are completely consumed within 30 min by the fish. If the live food is not taken within this interval, we suggest that the daily ration be divided into two or three smaller feedings during each day.

Residue Analysis—Food. Total body residues of the daphnids are determined for each feeding. Take duplicate 50-mg aliquots of the composite daphnid feeding for residue analyses. After weight determination, mix the sample with 6 ml of Triton-X 100: Fluoralloy® (2:3 v/v) emulsifier:fluor in toluene and homogenize with a teflon-coated Sorvall tissue grinder. Transfer the homogenate into a glass scintillation vial, bring it to a 15-ml volume with 9 ml of the fluor-toluene mixture and count overnight in a liquid scintillation counter. Make correction for quench and background radiation. Determine accuracy values with spiked ^{14}C samples.

By carefully monitoring the residues in the daily feeding throughout the 30-day interval, any adjustment in the daphnid fed the fish can be made.

Experiment Chamber—Fish. The fish tanks are all glass and have a 78.6 liter (20 gal) capacity. Each tank has a central drain and stand pipe with a PVC sheath (See Uptake—Daphnids) to insure proper removal of waste products from the lower layers of the container. The flow rate to each tank is adjusted for three complete turnovers per 24 h. The experimental tanks should be located in areas away from non-essential traffic. Every effort should be made to shield the fish from unnecessary visual and mechanical stimuli. Expose the fish to normal light and dark sequence from a natural source or use a 12 h photoperiod cycle with fluorescent light. Overcrowding of fish must be avoided. Fish loading per aquarium must not exceed 1 g fish per 1 l water. Water is maintained at 20±1°C. Acclimate the fish to the test chamber, temperature and intake of natural food for several days prior to the beginning of the experiment. Abrupt changes in temperature and water quality are to be avoided. Monitor each test tank for temperature, ammonia and oxygen concentration throughout the 32 day feeding schedule to detect and prevent potential stress of the fish (See also Stephan, et al., 1975).

Use bluegill (*Lepomis macrochirus*) preferably within the 0.5 to 1.5 g range. Avoid marked aggressive behavior and unequal food consumption between fish during the feeding experiments by carefully selecting fish on the basis of similarity in size and weight. The fish should be vigorous and healthy; the bluegill should readily accept natural food after acclimation. Disease or mortality in the holding stock should be negligible. The investigator should determine that all materials which may come in contact with the fish are nontoxic.

Fish Feeding Procedure. Distribute 50 bluegills equally into five 78.6 liter (20 gal) tanks. The five tanks with 10 fish each are designated groups 1, 2, 3, 4, and control. Groups 1, 2, 3, and 4 are fed treated daphnids for 7, 14, 21, and 28 days, respectively. The control is fed untreated daphnids for 28 days. The feeding schedule proceeds as follows:

Table 1—Daphnid-Bluegill Feeding Schedule
Duration: 32 days

Day:	*Activity*
0	Determine fish weight, groups 1, 2, 3, 4; Estimate daphnids biomass
1–2	Fish acclimation to aquaria
3–9	Feed daphnids to fish, groups 1, 2, 3, 4; daphnia TBR[1] determined daily
10–11	Clearing (no feedings) and determine TBR group 1; feeding adjustment[2], groups 2, 3, 4
10–16	Feeding Groups 2, 3, 4; daphnid TBR determined daily
17–18	Clearing and TBR group 2; groups 3, 4 feeding adjustment
17–23	Feeding Groups 3, 4; daphnid TBR daily
24–25	Clearing and TBR group 3; feeding adjustment group 4
24–30	Feeding Group 4; daphnid TBR daily
31–32	Clearing and TBR group 4; Experiment terminated
Optional	Group 5 degradation and/or clearing study

[1] Total body residue

[2] See text

Residue Analysis—Fish. When the specific feeding period is completed, the group receives no food for 48 h. After the 48 h elimination period, which permits the digestive tract of the fish body residue loss to evacuate, each fish from the groups is removed.

blotted dry and weighed. Each fish is ground *in toto* in a tissue grinder with 6 ml of Triton X-100 Fluoralloy® (2:3, emulsifier:fluor, v/v). Quantitatively transfer the homogenate from the griding tube with 9 ml rinse of the fluor-toluene mixture to a liquid scintillation vial. Because of potential quenching action with fish tissue, the total fish biomass per vial should not exceed 500 mg. If the sample is large, divide the sample into several subsamples and combine the counts for the final total body residue determination. Keep the liquid scintillation samples in the dark for at least 24 h to preclude counting errors due to internal phosphorescence. Place the samples in a liquid scintillation counter and determine counts per minute (cpm) for each sample. Convert cpm into quantities of xenobiotic present in each fish sample.

Analysis of Results. Report all residues on a weight/weight basis. Use only the wet weight values. Express all data as the mean ± standard error. Report fish residue values for the 7, 14, 21, and 28 days. Prepare a food transfer index for the xenobiotic (Total fish residue/Total daphnid residue). (Also see Index).

Uptake From Water and Natural Food

Combination Studies

Organisms: Daphnids (*Daphnia magna*)
Bluegill (*Lepomis macrochirus*)

Determine the uptake of xenobiotic by fish directly from water, from live food, and from a simultaneous combination of the two. The protocol previously describing the transfer of xenobiotic via natural food to fish closely parallels this procedure with one exception, the xenobiotic is also introduced directly to the fish from water.

Experimental Chamber. Select at least four 78.6 1 all glass aquaria with central drains and stand pipe with PVC (see also Water Uptake—Daphnid). Place 40 fish in each tank (see fish selection in feeding section) and maintain at 20±1°C. Use the McAllister *et al.* (1972) chemical metering device with the Mount and Brungs (1967) flow-through apparatus to deliver a pre-selected concentration of the xenobiotic.

Food Transfer and Xenobiotic Exposure. The four tanks are designated "control", "food" (F), "food and water" (F&W), and "water" (W). The "control" and "food" tanks receive only the carrier solvent of the xenobiotic from the diluter effluent. Tanks labeled "food and water" and "water" receive the xenobiotic in the effluent diluter flow at a predetermined concentration. These two tanks receive the xenobiotic after passing from a connecting mixing box (Benoit and Puglisi 1973). This process assures relative equal exposure concentration between the two test groups. The flow rate from the diluter should result in at least 3 complete turnovers/aquarium/24h. Tanks marked "food" and "food and water" receive treated daphnids at a rate of 5–10% fish weight per day (See daphnids feeding protocol). Feed the tank marked "control" and "water" untreated daphnids on a similar percentage basis. Take water samples in triplicate to verify the xenobiotic concentration introduced into the "water" and "water and food" tanks. Remove water samples daily for the first three days. If the water concentration of the xenobiotic remains relatively constant, take water samples twice per week thereafter (the fish residue day and four days later). Take water samples directly from the diluter effluent prior to its introduction into the experimental chamber with fish. (Water analysis—see Water Uptake—Daphnids).

Fish Feeding Procedure. (See Food Transfer—Filter-Feeding—Fish)

Residue Analysis Daphnid—Fish (See Food Transfer—Filter-Feeding—Fish)

Analysis of Results. All sample residues are expressed on a weight/weight basis. Express fish and daphnid residues only on a wet weight basis. All data are expressed as mean ± standard error. Report the mean water residue per week. Prepare a graph showing the uptake of xenobiotic by fish from water, food and the combination of both over time. Calculate an uptake factor (total body residue/water concentration) and uptake index (residue in fish/residue in food) (See also Index).

Water Uptake and Food Transfer Index

The food transfer index and water uptake index are both based on the comparison of a xenobiotic uptake directly from water or transfer from one trophic level to another via natural food with a reference compound. Because of its ubiquity and persistency in the natural environment, p,p'-DDT [1,1,1-trichloro-2,2 *bis* (p-chlorophenyl) ethane] is recommended as a reference xenobiotic Food Transfer Index. For example, if a bluegill contains a mean DDT total body residue (TBR) of 2 mg/kg after feeding 30 days on daphnids containing a mean TBR of 1 mg/kg DDT, we calculate a food transfer factor (FTF) as follows:

$$\text{FTF}=\frac{\text{Fish TBR}}{\text{Daphnid TBR}}\ (\text{w/w, wet weight})$$

Substituting

$$\text{FTF}=\frac{2\ \text{mg/kg}}{1\ \text{mg/kg}}$$

$$\text{FTF}=2.0$$

$$(\text{DDT})$$

If compound "Q", an experimental pesticide is introduced into a similar system and the daphnids contain a compound "Q" TBR of 250 µg/kg and the fish after the 30-day feedings contain a TBR of 50 µg/kg Compound "Q", the FTF is 0.25

$$\left[\text{FTF}=\frac{50\ \mu\text{g/kg}}{250\ \mu\text{g/kg}}\right]$$

Calculate the food transfer index as follows:

Food Transfer Index

$$=\frac{\text{Unknown Food Transfer Factor}}{\text{Reference Food Transfer Factor}\times 100}$$

Substitute the above data:

$$\text{FT Index}=\frac{0.25}{2.00}\times 100=12.5$$

$$\text{FT Index}=12.5$$

$$(\text{Compound "Q"})\ (\text{DDT}=100)$$

Water Uptake Index. Similarly a water uptake index may be prepared. First determine the uptake factor (UF) of the xenobiotic from water. Calculate this factor by dividing the water concentration of the xenobiotic (exposure concentration) into final daphnid TBR (preferably at an equilibrium concentration). For example, if the daphnids contain a TBR of 10 µg/mg p,p'-DDT after exposure to a 100 ng/l solution, we calculate the UF as follows:

$$\text{UF}=\frac{\text{Daphnid TBR}}{H_2O\ \text{concentration}}\ (\text{wet weight})$$

Substituting

$$\text{UF}=\frac{10\ \mu\text{g/mg}}{100\ \text{ng/kg}}$$

$$\text{UF}=10{,}000\ \times$$

If in a similar system the UF value for daphnid exposed to compound "Q" is 5,000 x, we may calculate a Water Uptake Index (WU Index) as follows:

WP Index = unknown UF/Reference UF × 100
Substituting:
WU Index = 5,000/10,000 × 100
WU Index = 50
(Compound "Q") (DDT = 100)

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Field-Testing Techniques [1]

No universally applicable methods are available for field testing of pesticides because of the wide diversity of mechanisms whereby a pesticide may enter the environment, the diversity of habitats which may be affected and the nature of the pesticide (solubility in water, degradability, etc.). However, a discussion of some aspects of field testing and a documentation of some previously used methods should be a useful aid to investigators in designing tests to meet particular situations. The following discussion is derived principally from a paper by Livingston et al. (1974) and was prepared by Dr. J. L. Lincer of the Mote Marine Laboratory.

Toxicity Tests Versus the Field Approach

The objective of laboratory toxicity tests is to determine the effect of a chemical on organisms under defined conditions. Toxicity tests are normally made under controlled conditions with only one or two variables, one normally being the toxicant. Often unnatural conditions are imposed upon the organisms being tested or effects which are important in the field are not considered. In acute tests, for example, the organisms are not usually fed nor are they permitted to avoid the toxicant, a behavior which may be possible in the field. The exposure period is for 1–4 days, often under static conditions, and the toxicant is not diluted as it normally is in the field. Chronic tests may start to approach the real world but, still, destructive or removal mechanisms, like sorption to particulates or photo-oxidation, are usually not present in the laboratory tests. Perhaps most important is the fact that organisms are usually not exposed to only one toxicant in the field. Laboratory tests have an obvious place in determining the toxicity of a chemical to various organisms or the toxicity of various chemicals to a given organism under specified conditions. However, extrapolation to field situations is not always feasible.

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[1] For a more comprehensive discussion of this topic, see Livingston, et al. (1974).

Although there is reason to believe that carefully controlled laboratory and field results may coincide (Mount, 1974), proper final diagnostic evaluations of effects must be made under adequately monitored field conditions with assist from carefully designed toxicity tests. Such studies should be interdisciplinary and are expensive but, in the end, probably provide the only definitive results.

SPECTRUM OF TECHNIQUES

In general, to find the ecological relevance of a laboratory finding, one moves in the direction of field studies. To find the cause(s) for an observed disturbance of the environment, it is often necessary to move into more controlled laboratory situations. Table 1 provides an overview of the kinds of ecosystems, pesticides, observed parameters and taxa reported in the literature. Table 2 displays aquatic species (by broad taxa) observed and/or used in field-testing pesticides.

Field Studies. In a *field survey*, a sampling method is devised to include: a broad range of the animal and plant life, both perturbed and unperturbed areas, seasonal changes, and where possible, before and after effects of some event, such as the application of a potentially registrable pesticide.

In contrast, a *monitoring program* implies continual sampling of the environment in order to detect changes as they occur. Depending on the circumstances at each site, it may be appropriate to shift from the survey to the monitoring program, or vice versa.

Alternatively, in *field tests*, organisms are maintained in cages or confined areas in the field environment. Such systems can continually assess the effect of the application on a series of representative species.

Aside from the physical difficulties of sampling or monitoring at particular sites or seasons, there are other potential disadvantages. Such methods can show that changes have taken place in organisms or in communities of organisms, but do not show what *caused* the changes unless adequate consideration is given to the statistical approach. At the very least, suitable replications and control areas are a must, and, of course, the value of pre-application field data becomes obvious.

Perturbed or Partitioned Environments. A portion of the real world can be partitioned off and purposely contaminated. Problems with this type of research are: (1) Deciding whether deliberate damage to even a small portion of the environment is justified by the information that will be obtained, (2) confining the damage to the area under study, (3) deciding whether the portion of the environment under study is representative, and (4) achieving sufficient control over the test area. The advantages are that the spill or contamination is under the control of the investigator so that pre-stress data can be gathered and the actual stress manipulated and measured, while the complexity of the real world is retained to a greater degree than in a laboratory study.

Models. Laboratory streams are full-scale models, over which a greater degree of control can be exercised than in a partitioned and perturbed stream in nature. Since the investigator has created an environment, he does not have the ethical problem of deciding whether his ends justify purposeful damage to a portion of the natural environment.

Microcosms are greatly simplified ecosystems, with perhaps less than ten species to represent some of the interaction occuring among hundreds of species in the environment.

Odum and others have developed methods of simulating ecosystem energy and materials flows on analog *computers*. Waller, et al. (1971) developed a stochastic model and computer program to predict long-term effects of different environmental zinc levels on as many as 100 generations of fat-head minnows. The predictive capability of such abstract models can often be improved as additional field and laboratory data become available. On the other hand, such models often indicate what types of information need to be gathered to understand ecosystem responses to perturbations. The parameters in stochastic models are allowed to vary, which probably better approximates the real world, than a nonvarying model.

Models have the advantage that the effect of environmental manipulations, even extreme manipulations, can be tested through many generations or seasonal cycles, without damage to the real world. The disadvantage of such models is that they are *twice removed* from reality—the model is a construct or simplification based on a sampling of information about the real world.

In summary, there are advantages and disadvantages associated with any technique used to determine pesticidal effects. Techniques should be used which combine elements of both field and lab approaches. The best problem-solving strategy is to use the techniques that will best answer the questtions being asked, and to avoid rigid adherence to one technique.

FEASIBILITY OF FIELD TECHNIQUES

With the inherent difficulties of sampling and variability encountered in any field study it might seem futile to attempt any such evaluation. If it is possible to adequately describe some aspect of a community then it should also be possible to identify changes in this characteristic induced by potential stressors, such as pesticides. The fact that this has *not* been done with any degree of sophistication arises from our inability to satisfactorily describe the unit we are dealing with.

Problems in studying a single species under field conditions revolve around sampling difficulties associated with the particular species. These difficulties may be minor with small randomly distributed sessile animals but great with mobile species and species with non-random distribution patterns. Nevertheless, it is still much easier to monitor changes in the growth rate, survival rate or reproductive activity of a single species than it is to evaluate a community or species assemblage.

The alternative to the community parameter approach is to consider elements of the fauna on an individualistic basis; identify and count the species collected and try to develop some understanding of the biology involved. This takes much more effort but the information return is much more useful. Unfortunately, there are no rules which have general application to all situations. Different communities and localities may require different sampling procedures. In some cases, dominant species may have a profound effect on the biology of a community and the fate or responses of *these* species (or opportunistic species that replace them) may provide useful predictions as to what might happen to the community as a whole.

Most applied environmental work reported in the literature has been executed in such a manner that it would detect only relatively major changes. However field approximations of pollutant interactions can be of paramount importance. Koenig, et al. (1974), for example, found that blue crabs (*Callinectes sapidus*) contaminated with DDT and its metabolites did not die in the field from such contamination unless periodic cold fronts caused significant reductions in the water temperature. The combined effect of the pesticide and temperature stress caused significant mortality. In this way field observations allowed identification of pollutant impact as a result of interaction with a significant modifying factor. This would emphasize a need for further experimental and field work on the impact of various pollutants under conditions of natural stress.

I spite of major difficulties, it is expected that as the theoretical and practical aspects of environmental research improve, there will be a capability to measure the effects of single and combined factors under field conditions. However, *"at this point in time"*, it appears that the only possible approach that might be standardized is that of the cage-type or confined-area exposure (Table 3). Since the confined area type of study requires a high degree of knowledge of the life history of the various species, the ecology of the area, etc., this would be very difficult to reduce to a routine.

GENERAL PRECEPTS FOR CAGE-TYPE FIELD-TESTING

Acquiring Organisms. Organisms may be collected locally or purchased from commercial fishermen. If captured, acceptable techniques, such as those recommended by the Environmental Protection Agency (1973), should be used. Whether organisms are collected directly or purchased, every effort should be made to insure that they are healthy and are not subjected to unnecessary stress. Perkins (1972) discussed the importance of using healthy animals and emphasizes the importance of stresses such as collecting, handling and maintenance.

Parameters. Parameters that should be studied which would relate to individual species include:

Mortality
Growth
Reproductive Success
Gross Behavior
Other observable changes within such fields as physiology, biochemistry, pathology, etc., which relate *directly* to the survival of the species.

Test Organisms. Based on the literature reviewed to date (Table 3), the *most common* species of fish used in cage-type field-testing pesticides are from the marine environment and are as follows: Sheepshead minnow (*Cyprinodon variegatus*); Mosquitofish (*Gambusia affinis*); Sailfin molly (*Poecilia latipinna*); Striped mullet (*Mugil cephalus*); Mummichog (*Fundulus heteroclitus*).

A similar list for invertebrates would include:

Crabs: Blue crab (*Callinectes sapidus*); Fiddler crab (*Uca minax, U. pugnax*).

Shrimp: Glass (*Palaemonetes pugio*); Other species of shrimp (like *Penaeus spp.*) are readily available, but have not been used frequently in cage studies.

Mollusks: Oyster (*Crassostrea virginica*).

Cage Construction. The construction of cages for specific taxa depends, of course, on the species, its predators, the habitat and the physical and chemical properties of the pesticide being tested. Although there has been some effort to describe an exposure cage for this purpose (Heitmuller and Nimmo, 1972), most cages vary with the investigator (see Table 3 for such studies).

Introduction of Pesticides and Monitoring. Pesticides should be introduced at the season and using the amount and formulation(s) expected to be used under actual spraying conditions. If adequate safeguards are available, another application at ten-fold the expected level might be applied to help identify subtle effects which could be important. Monitoring of the residue levels in the organisms and their environment over time is of particular importance with persistent pesticides. Water quality parameters (e.g., pH, temperature, and conductivity at least) should also be regularly monitored.

The Test Area. The area to be used should be as homogeneous as possible with respect to the biotic, physical and chemical environment. If the conditions change over time, they should be definable in terms of periodicity. Every effort should be made to choose an area which allows the investigator to prevent, control or minimize the spread of the applied pesticide.

Some General Considerations. 1. Be realistic in choice of species. Species collected locally will normally be easier to work with.

2. Be aware of the possibility of induced resistance.

3. If caged animals are to be used, a reasonable period of acclimation is necessary.

4. Within the constraints of acceptable techniques, choose the most sensitive species and/or life stage inhabiting that ecosystem.

TABLE 1.—*An overview of the field-testing of pesticides*

Ecosystem	Pesticide	Observed parameters	Taxa and/or species	Reference
Freshwater pond	DDT	Mortality	Fish, plankton, benthic invertebrates, reptiles, birds, mammals, terrestrial insects.	Tarzwell, 1948.
Enclosed area of freshwater pond.	DDT	Population	Fish	Do.
Tidal marsh ditch	DDT	Mortality and population; residue monitoring.	Fish, crabs	Croker and Wilson, 1965.
Do	Dieldrin	Mortality	do	Harrington and Bidlingmayer, 1958.
Tidal marsh	Strobane, DDT, and HCB	Mortality, gross behavior on fiddlers.	Fish, crabs, birds, mammals	George, et al., 1957.
Do	DDT. Aldrin, Dieldrin, and BHC.	Mortality	Fish, prawns, arthropods, isopods and amphipods, crabs, worms, mollusks, birds.	Springer, 1961.
Tidal marsh	DDT	Mortality, gross behavior growth (snails).	Fish, crabs, shrimp, insects, mollusks, amphipods, worms, mites, birds.	Springer and Webster, 1951.
Do	Dursban	Mortality, cholinesterase inhibition.	Fish, crabs, shrimp, mammals, birds.	U.S.D.I., 1968.
Mangrove swamp	Dibrom	Mortality, cholinesterase population.	Fish, crabs, mammals, birds, insects.	U.S.D.I., 1967(b).
Salt marsh, freshwater pond	Dursban	Mortality	Fish, shrimp, crabs, oysters, insects, terrestrial vertebrates.	U.S.D.I., 1967(a).
Estuaries	2,4-D	do	Fish, crabs, oysters, clams	Rawls, 1965.
Salt marsh	Malathion	Mortality, cholinesterase	Fish, crabs, shrimp, mollusks	Tagatz, et al., 1974.
Do	Dursban	Mortality, monitoring	Fish, crabs, shrimp, birds	Ludwig, et al., 1968.

TABLE 2.—*Aquatic species observed and/or used in field-testing of pesticides*

Pesticide	Fish	Crabs	Shrimp	Other invertebrates	Reference
DDT	Striped mullet, sheepshead minnow, rainwater killifish, sailfin molly, mosquitofish, spot, longnose killifish, gulf killifish, tidewater silverside, diamond killifish, darter goby.	Blue crab, fiddler	*Palaemonetes* species	Annelid worms	Croker and Wilson, 1965.
Dieldrin	Ten pounder, sea catfish, sailfin molly, striped mullet, snook, Irish pompano, red drum, spot, sheepshead, etc.	Portunids xanthids, fiddler, blue crab.	Shrimps	Amphipods, nudibranchs, snails, tethyonids, oysters.	Harrington and Bidlingmayer, 1958.
Strobane, DDT and BHC.	Mummichog, sheepshead minnow, spot, white mullet.	Blue crab, marsh fiddler, red-jointed fiddler, marsh crab.		Bryzoans	George, et al., 1957.
DDT, Aldrin, BHC, Dieldrin.	Various fish	Blue crab, marsh carb	Prawns	Isopods, amphipods, arthropod, mollusks (including snails and mussels), clam worms.	Springer, 1961 (abstract).
DDT	Mummichog, sheepshead, minnow, *Fundulus*.	Blue crab, fiddler	Grass		Springer and Webster, 1951.
Dursban	Pinfish, sheepshead, drum, mollies, *Fundulus*.	do	Bait		U.S.D.I., 1968.
Dibrom	*Fundulus*, snook Mangrove snapper.	do			U.S.D.I., 1967(b).
Dursban	Various species	do	White		U.S.D.I., 1967(a).
2,4-D	Pumpkinseed	Blue crab		Oyster, soft shell clam	Rawls, 1965.
Malathion	Sheepshead minnow	do	Grass pink	Snail	Tagatz, et al. (1974).
Dursban	Croakers, killifish, mullet	do	Brown		Ludwig, et al., 1968.

TABLE 3.—*Aquatic species used in field cage (C) of confined area (CA) type studies*

Species	Type of study (C or CA)	Reference
Fish:		
Sheepshead minnow (*Cyprinodon variegatus*)	CA	Croker and Wilson, 1965.
Gulf killifish (*Fundulus grandis*)		
Longnose killifish (*F. similis*)		
Rainwater killifish (*Lucania parva*)		
Mosquitofish (*Gambusia affinis*)		
Sailfin molly (*Mollienesia latipinna*)		
Striped mullet (*Mugil cephalus*)		
Tidewater silverside (*Menidia beryllina*)		
Mummichog (*F. heteroclitus*)	C	George, et al., 1957.
"Variegated cyprinodon" (*C. variegatus*)		
Spot (*Leiostomus xanthurus*)		
White mullet (*Mugil curema*)		
Cyprinodon killifish	C/CA	Springer and Webster, 1951.
Fundulus specie		
Pinfish	C	U.S.D.I., 1968.
Sheepshead		
Drum		
Mollies		
Fundulus		
Flounder (*Paralichthys* specie)	C	U.S.D.I., 1967(a).
Mullet (*Mugil cephalus*)		
Puffer (*Sphaeroides* specie)		
Sailfin molly (*Mollienesia latipinna*)		
Sheepshead minnow (*C. variegatus*)	C	Tagatz, et al. (1974).
Mullet (*M. cephalus*)	C	Ludwig, et al., 1968.
Croakers (*Leiostomus xanthurus*)		
Broad Killifish (*C. variegatus*)		
Gulf Killifish (*Fundulus grandis*)		
Invertebrates:		
Fiddler crab (*Uca minax*)	C	Croker and Wilson, 1965.
Blue crab (*Callinectes sapidus*)	C	George, et al., 1957.
Marsh fiddler (*Uca pugnax*)		
Red-jointed fiddler (*U. minax*)		
Marsh crab (*Sesarma reticulatum*)		
Blue crab (*C. sapidus*)	CA	Springer and Webster, 1951.
Marsh fiddler (*U. pugnax*)	C	
"Bait" shrimp (*Palaemonetes pugio*)	C	
Do	C	U.S.D.I., 1968.
Fiddler crab		
Blue crab (*C. sapidus*)		
White shrimp (*Penaeus setiferus*)	C	U.S.D.I., 1967(a).
Blue crabs (*C. saphidus*)		
Fiddler crabs (*Uca specie*)		
Oysters (*Crassostrea specie*)		
Soft shell clam (*Mya arenaria*)	C	Rawls, 1965.
Blue crab (*C. sapidus*)		
E. oyster (*C. virginica*)		
Blue crab (*C. sapidus*)	C	Tagatz, et al. (1974).
Grass shrimp (*Palaemonetes vulgaris*)		
Pink shrimp (*P. pugio*)		
Snail (*Littorina irrorata*)		
Blue Crab (*C. sapidus*)	C	Ludwig, et al. (1968).

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SUBPART C

Hazard evaluation: Wildlife toxicology VII.C-1
  Acute and subacute toxicity studies on wild mammals.... VII.C-3
    Protocol for determination of the approximate maximum tolerated dose........ VII.C-4
    Protocol for laboratory acute oral toxicity—Birds........ VII.C-8
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PART VII—HAZARD EVALUATION

SUBPART C—WILDLIFE TOXICOLOGY

Protocols for wildlife toxicology were compiled from a thorough review of the literature and unpublished data and from consultation with nearly all the wildlife toxicology experts in the field. All available protocols were evaluated and those judged most complete and valid have been included. Points of clarification were made throughout the accepted protocols. In most cases only one protocol was deemed applicable and in others it was necessary to prepare composites of protocols in the literature to arrive at an applicable protocol. The test methods were selected because of their overall strengths, with the recognition that any test method does have weaknesses.

Some philosophical preamble to each protocol has been included. This introduction specifies the validity of the test method.

For wildlife the acute oral toxicity test provides a standard unit of measurement to be compared with those of mammalian toxicity and toxicity to other organisms and, in the case of expected granular use, a direct measurement of effects likely from field applications. The 5-day dietary LC-50 is appropriate in determining the effect of a chemical applied to plant matter in the field. This test allows ingestion of a chemical and degradation as it passes through the digestive tract, absorption and metabolism of the pesticide over several days exposure at lesser concentrations. In addition the 5-day dietary LC-50 test exposes wildlife to compound volatility that may occur from the daily diet and to dermal contact via the face and feet from food in the container or that which is spilled. Together, both tests give information regarding chronicity of a pesticide.

The reproductive test should be used when it is known that the parent compound or one of its metabolites persists at significant levels in the environment for prolonged periods or when wildlife are subjected to repeated or continued exposure. This test provides data on a longer term feeding study than the dietary LC-50 and on reproduction and survival of young wildlife. Logically this test should follow data available from subacute, short-term dietary studies.

When requested under special conditions the acute dermal toxicity test may be requested and should follow the acute or subacute toxicity test(s).

As toxicity tests migrate from the laboratory to full-scale field tests, it becomes more realistic, but more difficult to control important parameters and variables. The simulated field tests, both small-pen and large-pen, provide intermediate data to evaluate wildlife toxicity under semi-natural conditions. Simulated field tests necessarily follow acute and sub-acute toxicity studies. Large-pen simulated tests have been used to measure chronic effects, including those on reproduction.

Data from laboratory tests and simulated-field tests are useful in planning an unrestricted field test. Again by necessity this test must follow both the acute and subacute toxicity tests and generally the simulated field tests. This unrestricted field test gives data on actual commercially treated pesticide target areas where non-target wildlife live unhampered in their feeding, mating and reproductive activities.

ACUTE AND SUBACUTE TOXICITY STUDIES ON WILD MAMMALS

Although general laboratory or domestic mammal toxicity data are required on both active ingredient(s) and formulation(s) as a normal component of the application for a pesticide registration, certain unique conditions of proposed usage may lead to special requirements for single dose (acute) and subacute toxicity studies on wild mammals. While comparative toxicities of compounds can be rather well judged by the results with standard laboratory mammalian tests, the extent of species variations in pesticide toxicity is certainly large. Therefore, it may be of occasional importance to undertake some additional toxicity evaluation with wild species occupying habitats which may be impacted by a proposed usage. Such data should only be required of the actual formulation(s) proposed for use.

The test protocol for determination of the "approximate maximum tolerated dose" develops minimal data regarding a species' sensitivity. It is useful when costs and various other complications in conducting tests with large and/or rare animal species preclude conventional toxicity testing. If these constraints do not apply, acute oral LD-50 and subacute dietary toxicity tests should be undertaken employing standard protocols for mammalian toxicity tests with management appropriate to the test species selected (e.g. Webb and Horsfall, 1967).

Protocol for Determination of the Approximate Maximum Tolerated Dose

The purpose of this test in wild mammals is to detect species differences to the toxic effects of a pesticide. As such, it is not always essential that precise LD-50 values be ascertained, rather the approximate maximum tolerated dose is estimated and the character of the toxic syndrome determined. Careful observations and thorough necropsy examination are essential.

Testing is carried out by preliminary range finding to establish the approximate lethal dose, and subsequently dosing additional animals with amounts according to the geometric progression indicated by the results or standard mammalian acute toxicity tests. Testing may use a single and/or multiple dosing schedule. The latter, if extended for at least 10 days or more, can be used to arrive at an impression of the relative chronicity of the pesticide in the wild species in place of an extended subacute toxicity test. After dosing, animals are observed for several days for delayed toxic effects. Beyond simply mortality, signs of intoxication such as loss of weight, anorexia, diarrhea, etc., are important. The general procedures followed in testing the toxicity of herbicides in cattle and sheep by the Toxicological Investigations Laboratory, Animal Disease and Parasite Research Division of the U.S.D.A. Agricultural Research Service are typical and represent common practice (U.S.D.A. Agricultural Research Service, 1969).

METHODS AND MATERIALS

Animal Selection. It must be appreciated that in undertaking toxicological evaluations using test species outside the normal types, many uncertainties arise and standardized protocols for such research do not exist. Those well-known major factors that influence LD-50 values within a species such as genetics, sex, age, nutritional and stress factors relating to unnatural conditions as well as social aspects within the micro-environment, are all subject to poor control and the test results, at best, are subject to uncertain interpretation. These precautions are ably discussed by Hurni (1970). The best policy to follow is to attempt, within the constraints dictated by the particular species selected, to exercise those principles of animal selection and management known to be sound: animals must be in healthy condition, as free of social and environmental stress as possible, acclimated to diet and uninfluenced by drugs. Normally, adults of similar age, as judged at least by body weight (but preferably by additional methods as well), would be used and data from both sexes should be obtained if possible. Use of reared stock would generally be preferable to live-trapped animals.

Animal Conditioning. Animals selected from appropriate sources are allowed a prolonged period of acclimatization to the test facilities and feed. Use of paired controls is desirable in tests with wildlife.

Dose Selection. Dosages are calculated on a mg/kg body weight basis for the active component(s) of each chemical tested. Selection of the dosage rates for each type of test animal involve several variables. The initial dosage level is estimated from existing acute toxicity data and the toxic range found by trial and error. When a toxic dosage was found, additional dosages above and below this rate are applied to other animals. Where a step-by-step increase of dosage indicates increased toxicity, repetition of individual dosages is not considered essential.

Chemical Administration. Oral dosing is generally accomplished by stomach placement of gelatin capsules containing the chemical or its formulation using a balling gun, or by "drenching" in which a solution or suspension of the chemical is introduced into the stomach by syringe and stomach tube. Occasionally it is necessary to conceal the dose in an attractive food item.

Toxicity differences may arise from the manner of dosing. Drenching usually involves water-diluted preparations as compared to undiluted material placed in capsules. Data from the ARS Toxicological Investigations Laboratory indicate general inconsistency between these forms of dosing but no generalization is possible favoring one over the other. Use of a solvent such as corn oil and its volume may also affect the acute toxicity evaluation.

For the immediate purpose of interspecies comparisons, it is suggested that the solvent or dispersant should match that used in the primary mammalian acute toxicity testing. The volume administered orally should never exceed 2-3 percent of the body weight and should be constant at all dosage levels.

Absorption effects related to the amount of feed in the digestive tract are normally minimized by overnight starvation prior to administration of the chemical dose. Feed should be provided following dosing and water *ad libitum* prior to and following dosing. Withholding feed for ruminants serves little purpose and it is preferred to maintain such animals on restricted feed allotments calculated to maintain body weight.

Dosing Schedule and Test Design. Testing may use a single and/or a multiple dose schedule. Using the single dose schedule the test animal is observed for several (approx. 10) days following the dose for signs of toxic effect (loss of weight, anorexia, abnormal function or behavior). Using the multiple dose schedule the test animal is observed during a series of 10 or more daily dose administrations. The observation period should be extended for 10 days following the last dose administered.

REPORTING OF DATA

The following is a check list of considerations used in reporting approximate maximum tolerated dose studies of pesticides on wildlife. Appropriate items are to be noted on control and treated test animals or groups before, after and during the test: Date of Test; Species; Source; Age and how determined; Body weight; Number per Test; Sex Distribution; Feed Description; Feed Consumption; Pesticide Dosing (pesticide formulation, type and description) dosage preparation, diluent concentration, volume administered, mode; Dose Schedule; Signs of toxicity (with day noted); weakness; posture; anorexia; diarrhea; irritability; other; Mortality; Accidental Deaths or Injuries; specifically note other signs indicated in previous mammalian tests; Necropsy Data; Histopathology (if suggested by observations in necropsy); Estimated Maximum Tolerated Dose; single dose administration; repeated dose administration.

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Protocol for Laboratory Acute Oral Toxicity—Birds

The purpose of this test is to determine the single-dose oral LD-50 of a pesticide to wild avian species under laboratory conditions. The information accumulated by completing this test will be used along with other toxicity information to evaluate the hazards of the chemical to wildlife.

The following protocol is a clarification of the USDA acute oral protocol (Exhibit #1) with some minor changes. The USDA protocol was the only protocol found that was detailed enough to be recommended as acceptable for use by EPA for their pesticide registration guidelines. Other references examined for wild birds are similar but lack specific details.

METHODS AND MATERIALS

Species and History. The test species of choice are pen-reared Bobwhites and Mallards not less than 16 weeks of age. Birds should not have been mated before being placed on test. A history of rearing practices such as photoperiod, medication, type of food, etc., should be included in the report.

All lots of birds should be healthy and uniform and without deformity. All lots should be weighed, then held for a minimum of 14 days prior to the test. If done indoors, temperature and humidity should be controlled, with freedom from drafts and sudden noises which could disturb the test birds. Any lots of birds that suffer an abnormal weight loss or above 10 percent mortality during the holding period should be discarded.

Cages. All birds shall be caged by treatment level groups or subgroups under acceptable animal husbandry practices.

Weight. All birds must be weighed in grams at the beginning of the test, and on days 3, 7, and 14 after oral administration. Also, birds should be weighed at termination of the test if it extends beyond 14 days.

Diet and fasting. Feed and water must be withheld from the control and test birds (Bobwhites and Mallards) for 15 hr prior to oral administration of the chemical. At all other times, birds shall have free access to feed and water. The diet fed must be a standard feed ration known to be adequate for game birds and without antibiotics.

Feed consumption shall be determined weekly for treated and control birds. The feed consumed must be reported as average daily food consumption for each dose level.

Preparation of test material. 1. When a diluent is required, the preferred diluent is distilled water. However, when a test chemical is not water-soluble, other diluents which may be used include table-grade corn oil, propylene glycol, and 1 percent carboxymethylcellulose. Diluents which have known toxic or emetic properties at the level used are to be avoided.

Recommended maximum amount of diluent per dosage is 0.1 to 1 percent of body weight. The total volume for all dosage levels should have a constant volume to body weight factor.

The diluent is to be administered to control birds at the same volume given test birds.

2. When a diluent is not used, the technical material should be accurately weighed directly or microsyringed into gelatin capsules from precisely diluted acetone solutions. The acetone should be completely evaporated off at room temperature before the capsules are used.

Method of administration. The test chemical is placed by oral intubation into the crop or proventriculus.

Number of birds per dose level. The number of test birds per treatment level shall be no less than 5 of each of sex. The number of control birds shall be no less than 5 of each sex. The number of birds per treatment level and the number of controls shall be reported.

Dosage-mortality data. The factor between dosage levels used to determine the acute LD-50 should be based on a geometric or logarithmic scale. There should be a minimum of 5 dosage levels used in calculating the acute oral LD-50.

The determination of an acute oral LD-50 shall follow any acceptable method. Two examples of acceptable methods are Thompson and Weil (1952) and Litchfield and Wilcoxon (1949).

Period of observation. The test animals shall be observed until death or for a minimum of 14 days. The observation period should be longer if signs of toxicity are still evident. The time of all deaths shall be recorded by day. If more than 10 percent of the control birds die during the test period, the test shall be considered invalid.

Recording of signs. All signs of intoxication shall be recorded as they occur.

REPORTING OF DATA

Should include pertinent information on the items listed below. The metric system should be used for units of measure. Dates of test; Species and rearing history; Sources of birds; Age and sex; Body weights; Diet used; Pen dimensions; If pen indoors or outdoors; Weather condition, if outdoors; Temperature and humidity data, if indoors; Feed consumption; Preparation of test material; Method of administration; Amount of test material dosed per bird; Amount of diluent dosed per bird, if used; Number of birds per treatment level; Number of controls employed; Method used for calculating LD-50; Length of observation period; Time of mortalities; Record of all signs of intoxication or if any regurgitation occurs.

The determined LD-50 and the confidence limits shall be reported in the following manner:

Test chemicals and purity or formulation.	Bird species and sex.	LD-50 in milligrams per kilogram (confidence limits).

Additional data. Necropsies could give valuable additional data, but are not necessarily required. When necropsies are conducted, they should include a general inspection of the digestive tract, liver, kidneys, heart and spleen at the time of death and at the termination of the test for both control and test birds. Any gross pathological changes should be reported.

References

Litchfield, L. J. and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect experiments. *J. Pharmacol. Exp. Theo.* 96 (2):99-133.

Schafer, E. W., R. B. Brunton, N. F. Lockyer, and J. W. DeGrazio. 1973. Comparative toxicity of seventeen pesticides to the Quelea, house sparrow, and red-winged blackbird. *Toxicol. Appl. Pharmacol.* 26: 154-157 (See page 155).

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Thompson, W. R. and C. S. Weil. 1952. On the construction of tables for moving average interpolation. *Biometrics* 8:51-54.

Tucker, R. K. ad D. G. Crabtree. 1970. Handbook of Toxicity of Pesticides to Wildlife. Fish and Wildlife Service. Resource Publication 84 (See pages 6 and 7).

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U.S. Dept. of Agriculture. 1968. Bobwhite Quail Laboratory Acute Oral Toxicity Test Method (Test A-2). Pesticides Regulation Division, Washington, D.C. (Exhibit 1)

EXHIBIT 1

BOBWHITE QUAIL LABORATORY ACUTE ORAL TOXICITY TEST METHOD

Pesticides Regulation Division
Rodenticides Evaluation Staff

Conditions and procedures described below relate to routine measurements of acute oral toxicity or pesticides to bobwhite quail under laboratory conditions. The results of these tests may be used only as a general guide to the toxicity class of a given pesticide. The nature of some pesticides may require that chronic, dermal and inhalation tests be conducted to further evaluate certain characteristics of the chemical. The acute oral toxicity protocol is not a valid method for chronic studies.

Evaluation as to the hazard of a formulation in the environment may require field testing.

METHODS AND MATERIALS

A. *Species.* The test species of choice is pen reared bobwhite quail not less than 16 weeks of age. (However, if bobwhite quail are unavailable, a second choice would be pen reared Coturnix quail not less than 10 weeks of age). Birds should not have mated before being placed on test.

All lots of birds should be healthy and uniform and without deformity. All lots should be weighed, then held indoors 21 days under controlled temperature and humidity prior to using them in a test. Any lots of birds that suffer an abnormal weight loss or 10% mortality during the holding period should be discarded.

The test room should also have controlled temperature and humidity as well as freedom from drafts and sudden noises which will disturb the birds.

B. *Sex.* The sexes of the birds placed on test and on control shall be equally divided. All birds shall be individually caged. The minimum cage size for bobwhite quail shall be no less than 12'' x 20'' x 10'' high, with food and water placed on the outside of the test cage.

C. *Weight.* Weight must be recorded in grams for all birds at the beginning of the test. Three days after dosing, all surviving birds must be weighed again and every three days thereafter to the termination of the test.

D. *Diet and fasting.* All birds shall have free access to feed and water prior to and after dosing. The feed diet must be a standard feed ration known to be adequate for game birds and without antibiotics. Feed and water must be withheld from the control and test birds for 15 hours prior to dosing.

Feed consumption shall be determined daily. The feed consumed must be reported as average daily food consumption for each dose level.

E. *Preparation of test material.* When the test chemical is in liquid form it must be administered in that form. When a diluent is required the preferred one is distilled water. However, when a test chemical is not water soluble, other diluents which may be used are: table grade corn oil, propylene glycol, carboxymethylcellulose, and normal saline. Diluents which have known toxic properties are to be avoided.

The diluent is to be administered to control birds at the same dose level given test birds, but without the test chemicals.

The diluent shall be reported.

F. *Method of administration.* The method of administration of the test chemical may be by encapsulation or by oral injection with a syringe equipped with a flexible catheter.

The method of administration shall be reported.

G. *Number of birds per dose level*. After a dose range has been determined, by range finding techniques, the number of test birds per dose level shall be no less than 10 of each sex.

The number of control birds shall be no less than 10 of each sex.

The number of birds per dose level and the number of controls shall be reported.

The determination of an acute oral LD_{50} shall follow the method outlined by Litchfield and Wilcoxon.*

The determined LD_{50} and the confidence limits shall be reported in the following manner:

Test Chemical & Purity, Bird Species & Sex,
LD_{50} in Mg/Kg, (Confidence Limits)

H. *Dose Interval*. After the general toxicity range has been determined, the dose interval used to determine the acute LD_{50} should be based on a geometric or logarithmic scale. The dose range should provide not more than 20% mortality at the low end of the scale, 40-60% mortality at the center of the scale, and not less than 80% mortality at the upper end of the scale.

I. *Period of Observation*. The test animals shall be observed until death or for 21 days after dosing. The time of death shall be recorded by day.

If 20% or more of the control birds die during the test period, the test shall be considered invalid.

J. *Recording of Symptoms*. When symptoms of intoxication occur, they shall be recorded daily.

K. *Necropsies*. A general inspection of the digestive tract, liver, kidneys, and spleen should be made at the time of death or at the end of the test period for both control and test birds. Any gross pathological changes shall be reported.

L. Reporting of the experiment shall include pertinent information on the above listed sections A through K. The mortality curve, plotted on logarithmic-probability graph paper, and a copy of the laboratory worksheet must accompany the final report.

PROTOCOL FOR DETERMINING LETHAL DIETARY CONCENTRATIONS OF CHEMICALS TO BIRDS (5 DAY-DIETARY-LC-50)

The determination of the relative toxicity of economic poisons to birds is valuable in assessing the potential hazard of chemicals to wildlife. Because the route of exposure of chemicals in birds is commonly through ingestion, this test procedure is appropriately useful. This basic method as described by Heath and Stickel (1965) and Heath et al. (1972), is the only published protocol on avian LC-50 determination.

METHODS AND MATERIALS

Test. This method determines a chemical's toxicity to birds expressed as the median lethal concentration (LC-50) of chemical (technical material) in dry diet. The LC-50 being the parts per million (ppm) toxicant in an *ad libitum* diet expected to produce 50 percent mortality among 2 to 3 week old birds in 8 days (5 days on treated diet followed by 3 days on untreated diet).

Species. This protocol is appropriate, with modifications, for most bird species, but it addresses primarily the Mallard and Bobwhite.

Source of strain of birds. Test birds should be pen-reared and phenotypically indistinguishable from wild birds. It is recommended that birds be utilized only from colonies that have had breeding histories maintained for them.

Age and sex. Test birds should be neither less than 10 days nor greater than 15 days of age at the initiation of the test. It should be noted that LC-50 determinations may be affected by the age of the birds at the time of testing.

A random selection of brids without regard to sex should be used because determination of sex is not feasible at this age.

Health of Birds. Only birds in apparent good health should be used. Birds with obvious abnormalities, injuries or sickly in appearance should be excluded.

Pen Facilities. Pen conditions should conform to good husbandry practices. The following appears satisfactory:

Size. Bobwhite (about 10 birds per pen) may be tested in commercial brooder units with individual pens measuring approximately 35 x 100 x 24 cm high. Waterfowl (Mallards) may be tested in pens 70 x 100 x 24 cm high. Floors and external walls can be of wire mesh, while ceilings and common walls may be of galvanized sheeting.

Temperature and Relative Humidity (RH). For Bobwhites and Mallards, temperature should be about 35°C. It can be maintained with thermostatically controlled central heating. The relative humidity should be about 30-80 percent. Adequate ventilation should be maintained.

Lighting. Fluorescent or incandescent lighting may be supplied varying light regimens. It may follow the diurnal variation or be maintained continuously 24 hours per day.

Test Diets. A standard commercial game bird diet or its equivalent should be used. Water should be continuously available.

To prepare test diets, the chemical may be dissolved in table-grade corn oil or other necessary vehicle (i.e. propylene glycol) and mixed thoroughly with dry commercial mash in a ration of 2 parts of solution to 98 parts of feed by weight. An equivalent amount of vehicle should be added to untreated diets. Diets can be mixed by commercial, mechanical food mixers. Only freshly mixed diets should be used.

Number of Concentrations. Generally, each chemical should be administered in 6 dietary concentrations spaced geometrically over a span intended to produce mortality ranging from 10 to 90 percent. It is advisable to perform a range finding study prior to selecting concentrations for testing.

Test birds should be preconditioned to the test facilities for at least one day prior to testing and fed untreated food prior to dosage.

Number of Birds/Concentration. From 6 to 15 birds or more may be used per concentration; 10 birds per concentration seems to be practical and is statistically useful.

Use of Dieldrin Standard. A dieldrin "standard" of 6 concentrations plus 3 pens of controls can be included with any given set of chemicals being tested to identify possible differences in animal sensitivity between experiments. Dieldrin "standard" tests may be optional at given laboratories that have established the "standard" in prior tests for assessing their bird colonies and that are repeatedly conducting LC-50 determinations. It is advisable to annually conduct dieldrin "standard" tests to assure continued uniformity of bird colonies.

Observations on Signs of Intoxication. Throughout the test, all signs of intoxication and abnormal behavior should be noted. Any unusual manifestation of the chemical to the test birds should be recorded.

Food Consumption. Estimates of average food consumption as measured daily per selected pens should be made for birds in each test. Although food spillage hinders this calculation, this datum, along with other information may be useful in the evaluation of the hazards or repellency of a particular chemical.

Statistical Design. A completely randomized design should be used in each experiment with treatments and birds randomly assigned to pens.

Statistical Procedure for Handling Data. The LC-50 values and associated statistics can be derived by methods of probit analysis as described by Finney (1952) and programmed for computer by Daum and Killcreas (1966). The application of the basic probit method by Litchfield and Wilcoxon (1949), Weil (1952), Miller and Tainter (1944) or other appropriate sources may be utilized.

REPORTING OF DATA

The following information and data should be reported: Dates of test; Species; Breeding history of test birds; Source and strain of test birds; Age (days); Sex; Housing conditions (including temperature, RH., lighting); Test diets; Chemical tested (chemical structure); Diluent(s) used; Number of concentrations of chemical used; Number of birds per concentration; Standard used; Signs of intoxication (including unusual responses to chemical by test birds); Food consumption; LC-50 determinations (ppm) with 95 percent confidence limits.

ADDITIONAL DATA (IF COLLECTED)

Analysis of concentrates; Length of observations (if observation period extended); gross pathology.

Additional Considerations—Analysis of Concentrates. It may be desirable to sample and analyze the chemical diet pre-mix concentrate to determine the level of chemical used in treated diets.

Length of Observation. The period after the 5-day exposure of birds to treated diets should be extended as long as test birds exhibit toxic signs or birds die.

Gross Pathology. Pathological examination should be conducted on a sample of birds that die and some survivors to identify gross lesions. These data may be useful for diagnostic purposes related to mortality of birds that might die in the field.

References

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Weil, C. S. 1952. Tables for convenient calculation of median-effective dose (LC-50 or ED-50) and instructions in their use. *Biometrics*. 8:249-263.

REPRODUCTION TESTS ON BIRDS

The Environmental Protection Agency may require reproductive studies with some pesticides on the Bobwhite and Mallard, under certain circumstances, for the registration of the pesticide. Results from such tests should reflect possible kinds of effects of any pesticide on all reproductive parameters if

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*Litchfield, J. T., Jr. and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect experiments. *J. Pharm. and Exp. Therap.* 96:99-113 (May-August).

possible, including chronic effects. Reproductive parameter measurements should include effects on the adult, egg and hatched young. Pesticides which may require such testing are those which are persistent, are stored or accumulate in plant or animal tissues, or are used under conditions where wild birds may be subjected to repeated or continuous exposure.

Although the reproductive parameters measured for both species are similar, the detailed information required makes it necessary to have a separate protocol on each species. These protocols themselves are not complete but furnish, along with the more specific information in references cited, the backbone of information necessary and desired to properly evaluate the effects of pesticides on the reproduction of the Bobwhite and Mallard.

Most of the bird reproduction data in the literature dates from 1970 and has been on the chicken, Japanese quail, Ring-necked pheasant and certain species of doves and finches, etc. No suitable complete protocol was available from any of the literature for the Bobwhite; more information (but still insufficient) was available for the Mallard, especially in respect to the egg-shell thinning parameter of bird reproduction. Literature references have been written by researchers already familiar with bird tests, so many details were not included in the protocol of such writeup. Therefore, the recent unpublished literature, as well as published literature, was used as a basis, not for writing new test methods, but for preparing a composite of information on the Bobwhite and Mallard which would constitute working protocols on reproduction.

The reproduction test is also useful as a measure of chronic toxicity as well as teratogenicity. It is a logical test to follow the 5-day dietary LC-50 test and to do before field testing on a large scale. Care must be taken with measuring the reproduction parameters since there is considerable variation depending on the care taken in all stages of the test. Since all tests are compared with the control, misleading comparisons on test chemical evaluations may occur if normal variations in test data are not established in control birds for each parameter.

PROTOCOL FOR EVALUATION OF REPRODUCTIVE EFFECTS OF PESTICIDES ON THE BOBWHITE

METHODS AND MATERIALS

Test animals. Pen-reared Bobwhite previously untreated approaching their first breeding season, phenotypically indistinguishable from wild birds, should be used as test animals. All birds should be examined following shipment for possible physical injury that may have been encountered in transit. If deemed necessary, several birds may be randomly selected for pretreatment necropsy at a diagnostic laboratory to assess the state of health upon arrival.

It is recommended that a history of rearing practices be ascertained. This history should include lighting practices during rearing, disease record, drug and any other medication administered and exact age.

If Bobwhite that have completed one or more breeding seasons are to be used as test animals, then they must be obtained prior to the onset of egg production for another breeding season.

Test groups. A minimum of 3 test groups of Bobwhite should be used. One group must serve as a control and 2 groups as treated birds.

By random distribution, 1 male and 2 females per pen, replicated by a minimum of 12 pens, should be used. If 1 male and female per pen are used, additional pens should be added.

Group No.	Dosage level	Number of pens	Birds/pen	
			Male	Female
1—control	0	12	1	2
2—treated	X parts per million.	12	1	2
3—treated	(n) X parts per million.	12	1	2

NOTE.—(n) = some multiple.

Diet preparation. Concentrations of test substances should be used in relationship to residues expected or determined from the proposed registered use patterns for the compounds. The highest nonlethal level may be estimated from data used in calculating the 5-day dietary LC-50.

Test material should be added to table grade corn oil or other appropriate vehicle and premixed with an aliquot of basal diet utilizing a mortar and pestle or mechanical blender. It is recommended that the aliquot of basal diet used for the premix be screened to remove large particles of diet before blending in the corn oil and test material. The final diet should be a uniformly mixed composition consisting of 98 or 99 parts by weight of the basal diet and 2 or 1 parts by weight of corn oil. The basal diet should be a commercial game bird breeder ration or its equivalent and treated with an equivalent amount of vehicle. The premix should be stored frozen until utilized for preparation of the test diet. Test diets should be prepared periodically to prevent deterioration of the diet. Test diets should be analyzed for pesticide concentrations at intervals during the tests.

Testing Phase—Test Environment. The Bobwhite should be housed in breeding pens of adequate size conforming to good husbandry practices.

Since light treatment is extremely important, both during rearing and during the egg laying period, for maximum egg production all Bobwhite should be maintained for the first 8 weeks under a regime of 7 hours of light per day.

The photoperiod should then be increased to 16–17 hours of light per day and either maintained at this level or increased by 15 minutes per week for the following 12 weeks. (The 12-week period may vary depending upon the time required for the onset of egg production.) An illumination intensity of 5 ft-candles at the bird level during the lighting phase of the reproductive study is adequate. Avoid the use of shorter wave length "cool white" fluorescent lights which do not simulate the daylight spectrum.

Temperature and relative humidity control throughout the reproductive test is desirable and should be recorded. Recommended levels approximate 21°C and 55 percent relative humidity. Ventilation is necessary.

Feeding and Husbandry. All birds should receive the appropriate diet *ad libitum* for the duration of the study. Water is to be provided *ad libitum*. The test chemical should be administered not less than 10 weeks before egg laying is expected.

Body weights should be recorded at weeks 0, 2, 4, 6, 8 and at the termination of treatment. During egg laying body weight recording is discouraged because of the adverse effects that handling may have on egg production.

Food consumption should be recorded at least at biweekly intervals throughout the study.

Mortality should be recorded by date and morbidity noted together with clinical signs throughout the test phase. Gross pathology data should be considered for birds that die during the course of the test phase and for some survivors.

Egg Collection, Storage and Incubation. All eggs should be collected daily, marked according to pen from which collected, and stored at 16°C and 65 percent relative humidity. Eggs should be set at weekly intervals for incubation in a commercial incubator. All eggs should be candled on Day 0 for eggshell cracks; on approximately Day 11 to measure fertility and early death of embryos; and on Day 21 to measure embryo survival. Transfer should be made on Day 21 to a separate commercial incubator or hatcher for hatching.

Recommended temperatures and relative humidity during incubation are approximately 37.5°C and 60 percent relative humidity. Recommended temperatures and relative humidity during hatching phase are approximately 37°C and 70 percent, respectively.

Chick Observation. On Day 24 of incubation the hatched chicks should be removed, hatchability recorded, and chicks housed according to the appropriate parental grouping and maintained on control diet for 14 days (extend if appreciable late mortality occurs). The diet should be a commercial Bobwhite starter diet or its equivalent.

Eggshell Thickness. All eggs from 1-day's collection at biweekly intervals should be measured for eggshell thickness. Preferably, eggs laid in the first part of weeks 1, 3, 5, 7, and 9 of the egg-laying period should be used for eggshell measurements. An accepted procedure is to crack open the eggs at the widest portion (girth or waist), wash out all egg contents, air dry the shells at least 48 hours, and then measure the thickness of the dried shell plus the membranes at 3 or 4 points around the girth using a micrometer calibrated to 0.01 mm units.

Analysis. Experimental groups should be compared to the control group by analysis of variance. Sample units are the individual pens within each experimental group. Parameter analyses should include: body weight, food consumption, eggs laid, eggs cracked, eggs set, fertility, live 3-week embryos, hatchability, normal chicks, 14-day-old survivors per number of eggs hatched and per hen, and eggshell thickness.

Definitions and Typical Observed Values. The values reported here represent those observed from a few facilities under their conditions and are not necessarily representative of those from all facilities.

1. Eggs laid

Definition. The total egg production during a breeding season (which is approximately 10 weeks).

Normal Values. 28 to 38 eggs per hen per season.

2. Eggs cracked

Definition. Eggs determined to have cracked shells when inspected with a candling lamp; fine cracks cannot be detected without utilizing a candling lamp and if undetected will bias data by adversely affecting embryo development.

Normal Values. 0.6 percent to 2.0 percent.

3. Eggs set

Definition. All eggs placed under incubation, i.e., total eggs laid minus cracked eggs and those selected for eggshell thickness analysis. The only value in presenting this parameter is to establish a base of reference for viable embryos.

4. Viable embryos

Definition. Eggs in which fertilization has occurred and embryonic development has begun. This is determined by candling the egg 6 to 14 days after incubation has begun. It is difficult to distinguish between the absence of fertilization and an early embryonic death. This distinction can be made by breaking out eggs that appear infertile and examine further. This is especially important in the event a test compound induces early embryo mortality.

Normal Values. 75 percent to 90 percent.

5. Live 3-week embryo

Definition. These are embryos that are developing normally after 3 weeks of incubation. This is determined by candling the egg.

Normal Values. 97 percent to 99 percent.

6. Hatchability

Definition. Embryos that mature, pip the shell, and liberate themselves from their eggs on Day 23 or 24 of incubation (computed from the number of fertile eggs).

Normal Values. 50 percent to 90 percent.

7. 14-day-old survivors

Definition. Birds that survive for 2 weeks following hatch.

Normal values. 75 percent to 90 percent.

8. Eggshell thickness

Definition. The thickness of the shell and the membrane of the egg at the girth after having been opened and washed, and dried for at least 48 hours at room temperature.

Normal values. 0.20 mm to 0.22 mm.

Additional Data. If the test substance is toxic (reduced reproduction evident) then a withdrawal study period may be added to the test phase. The withrawal period need not exceed 8 weeks. Continued observations can be made on egg production, fertility, hatchability and hatchling survival.

REPORTING OF DATA

Basic data supporting the above analyses should be tabulated. All abnormal behavior, morphological, physiological or other parameters observed should be included. Interpretation of test conditions or results known to be unusual or anomalous should be included if possible. All items in the following list should be considered when reporting results.

Appropriate items are to be noted on untreated and treated test groups before, after and during the test: Dates of test; Species; Strain; Source; Age; Body weight; Number per test (include sex ratio); Individual identification of birds; Diet; Storage; Feed consumption (grains per day); Observations on platability or repellency.

Housing conditions of test birds; Include space allocations for mating, nesting; Include protection from weather, injuries; Lighting program including hours per day, wattage or footcandles at bird level; Diagram of test layout; Temperature; Water supply; Morbidity; Mortality; Accidental deaths or injuries; Pretest and test history of medical and chemical administration; Observable clinical signs; Clinical tests; Post mortem autopsy.

Egg data; Shell Thickness; Cracked Eggs; Eggs Laid (number eggs per bird per day and per season); Hatching egg storage data; Temperature; Humidity; Days; Incubation data; Eggs set; Temperature; Humidity; Turning Frequency; Fertility (viable embryos); Live 3-week embryos; Hatchability; Pipped; Dead embryos; Post-hatching (juvenile birds); Cripples; Morbidity; Mortality (14-day-old survivors); Weight; Clinical signs.

Application of pesticide (judge toxicant levels based on field application calculations); Formulation (in corn oil); Method (dietary-acute, capsule, water?); Analytical or bioassay method; Pesticide dosage in food (ppm); Pesticide dosage in bird (mg/kg/day); Stability of pesticide in diet.

References

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PROTOCOL FOR EVALUATION OF REPRODUCTIVE EFFECTS OF PESTICIDES ON THE MALLARD

METHODS AND MATERIALS

Test Animals. Pen-reared Mallards previously untreated approaching their first breeding season, phenotypically indistinguishable from wild birds, should be used as test animals. All birds should be examined following shipment for possible physical injury that may have been encountered in transit. If deemed necessary, several birds may be randomly selected for pre-treatment necropsy at a diagnostic laboratory to assess the state of health upon arrival.

It is recommended that a history of rearing practices be ascertained. This history should include lighting practices during rearing, disease record, drug and any other medication administered and exact age.

If Mallards that have completed one or more breeding seasons are to be used as test animals, then they must be obtained prior to the onset of egg production for another breeding season.

Test Groups. A minimum of 3 test groups of Mallards should be used. One group must serve as a control and 2 groups as treated birds.

By random distribution a minimum of 2 males and 5 females per pen, replicated by 4 or more pens, should be used. If individual pairs (1 male and 1 female) are to be used per pen, a minimum of 10 pens should be employed. The tables below illustrate these 2 options:

Group No.	Dosage level	Minimum number of pens	Birdspen	
			Male	Female
1—control	0	4	2	5
2—treated	Xparts per million.	4	2	5
3—treated	(n)Xparts per million.	4	2	5

NOTE.—(n) = Some multiple.

Group No.	Dosage level	Minimum number of pens	Birds/pen	
			Male	Female
1—control	0	10	1	1
2—treated	Xparts per million.	10	1	1
3—treated	(n)Xparts per million.	10	1	1

NOTE.—(n) = Some multiple.

Diet Preparation. Concentration of test substances should be used in relationship to residues expected or determined from the proposed registered use patterns for the compound. The highest nonlethal level may be estimated from data used in calculating the 5-day LC-50 level.

Test material should be added to table grade corn oil or other appropriate vehicle and premixed with an aliquot of basal diet utilizing a mortar and pestle or mechanical blender. It is recommended that the aliquot of basal diet used for the premix be screened to remove large particles of diet before blending in the corn oil and test material. The final diet should be a uniformly mixed composition consisting of 98 or 99 parts by weight of the basal diet and 2 or 1 parts by weight of corn oil. The basal diet should be a commercial game bird breeder ration or its equivalent and treated with an equivalent amount of vehicle. The premix should be stored frozen until utilized for preparation of the test diet. Test diets should be prepared periodically to prevent deterioration of the diet.

Test diets should be analyzed for pesticide concentration at intervals during the tests.

Test Environment. The Mallards should be housed in breeding pens of adequate size conforming to good husbandry practices. Preferably the pens should be screen-bottomed or kept clean of spilled treated food and excrement.

Since light treatment is extremely important, both during rearing and during the egg laying period, for maximum egg production, all Mallards should be maintained for the first 8 weeks under a regime of 7 hours of light per day.

The photoperiod should then be increased to 16–17 hours of light per day and either maintained at this level or increased by 15 min per week for the following 12 weeks. (The 12-week period may vary depending upon the time required for the onset of egg production.) An illumination intensity of 5 footcandles at the bird level during the lighting phase of the reproductive study is adequate. Avoid the use of shorter wave length "cool white" fluorescent lights which do not simulate the daylight spectrum.

Temperature and relative humidity control throughout the reproductive test is desirable and should be recorded. Recommended levels approximate 21°C and 55 percent relative humidity. Ventilation indoors is necessary.

Feeding and Husbandry—All birds should receive the appropriate diet *ad libitum* for the duration of the study. Water is to be provided *ad libitum*. The test chemical should be administered not less than 10 weeks before egg laying is expected.

Body weights should be recorded at weeks 0, 2, 4, 6, 8 and at the termination of treatment. During egg laying, body weight recording is discouraged because of the adverse effects that handling may have on egg production.

Food consumption should be recorded at least at biweekly intervals throughout the study.

Mortality should be recorded by date and morbidity noted together with clinical signs throughout the test phase. Gross pathology data should be considered for birds that die during the course of the test phase and for some survivors.

Egg Collection, Storage and Incubation—All eggs should be collected daily, marked according to pen from which collected, and stored at 16° C and 65 percent relative humidity. Eggs should be set at weekly intervals for incubation in a commercial incubator. All eggs should be candled on Day 0 for eggshell cracks; by Day 14 of incubation to measure fertility and early death of embryos, and on Day 21 to measure embryo survival. Transfer should be made on Day 23 to a commercial incubator for hatching.

Recommended temperatures and relative humidity during incubation are 37.5° C and 60 percent respectively. Recommended temperatures and relative humidity during hatching phase are 39° C and 70 percent respectively.

Duckling Observations. On Day 27 of incubation the hatched Mallard ducklings should be removed, hatchability recorded and ducklings housed according to the appropriate parental grouping and maintained on control diet for 14 days (extended if appreciable late mortality occurs). The diet should be a commercial Mallard starter diet or its equivalent.

Eggshell Thickness—All eggs from 1-day's collection at biweekly intervals should be measured for eggshell thickness. Preferably, eggs laid in the first part of weeks 1,3,5,7 and 9 of the egg-laying period should be used for eggshell measurements. An accepted procedure is to crack open the eggs at the widest portion (girth or waist), wash out all egg contents, air dry the shells at least 48 hours, and then measure the thickness of the dried shell plus the membranes at 3 or 4 points around the girth using a micrometer calibrated to 0.01 mm units.

Analysis—Experimental groups should be compared to the control group by analysis of variance. Sample units are the individual pens within each experimental group. Parameter analyses should include: body weight, food consumption, eggs laid, eggs cracked, eggs set, fertility, live 3-week embryos, hatchability, normal ducklings, 14-day-old survivors per number of eggs hatched and per hen; and eggshell thickness.

Definitions and Typical Observed Values. The values reported here represent those observed from a few facilities under their conditions and are not necessarily representative of those from all facilities.

1. Eggs laid

Definition. The total egg production during a breeding season (which is approximately 10 weeks).

Normal Values. 28 to 38 eggs per hen per season.

2. Eggs cracked

Definition. Eggs determined to have cracked shells when inspected with a candling lamp; fine cracks cannot be detected without utilizing a candling lamp and if undetected will bias data by adversely affecting embryo development.

Normal Values. 0.6 percent to 5 percent.

3. Eggs set

Definition. All eggs placed under incubation, i.e., total eggs laid minus cracked eggs and those selected for eggshell thickness analysis. The only value in presenting this parameter is to establish a base of reference for viable embryos.

4. Viable embryos (fertility)

Definition. Eggs in which fertilization has occurred and embryonic development has begun. This is determined by candling the egg 6 to 14 days after incubation has begun. It is difficult to distinguish between the absence of fertilization and an early embryonic death. This distinction can be made by breaking out eggs that appear infertile and examine further. This is especially important in the event a test compound induces early embryo mortality.

Normal Values. 85 percent to 98 percent.

5. Live 3-week embryo

Definition. These are embryos that are developing normally after 3 weeks of incubation. This is determined by candling the egg.

Normal Values. 97 percent to 99 percent.

6. Hatchability

Definition. Embryos that mature, pip the shell, and liberate themselves from their eggs on Day 25 to 27 of incubation (computed from the number of fertile eggs).

Normal Values. 50 percent to 90 percent.

7. 14-day-old survivors

Definition. Birds that survive for 2 weeks following hatch.

Normal Values. 94 percent to 99 percent.

8. Eggshell thickness

Definition. The thickness of the shell and the membrane of the egg at the girth after having been opened and washed, and dried for at least 48 hours at room temperature.

Normal Values. 0.31 mm to 0.38 mm.

REPORTING OF DATA

Basic data supporting the above analyses should be tabulated. All abnormal behavior, morphological, physiological, or other parameters observed should be included. Interpretation of test conditions or results known to be unusual or anomalous should be included if possible. All items should be considered when reporting results.

Appropriate items are to be noted on untreated and treated test groups before, after and during the test: Dates of test; Species; Strain; Sources; Age; Body weight; Number per test (include sex ratio).

Individual identification of birds; Diet; Storage; Feed consumption (grams per day); Observations on palatability or repellency; Housing conditions of test birds; Include space allocations for mating, nesting; Include protection from weather, injuries; Lighting program including hours per day, wattage of footcandles at bird level; Diagram of test layout; Temperature; Water supply; Morbidity; Mortality; Accidental deaths or injuries; Pretest and test history of medical and chemical administration; Observable clinical signs; Clinical tests; Post mortem autopsy.

Egg data; Shell thickness; Cracked eggs; Eggs laid (number eggs per bird per day and per season); Hatching egg storage data; Temperature; Humidity; Days; Incubation data; Eggs set; Temperature; Humidity; Turning frequency; Fertility (viable embryos); Live 3-week embryos; Hatchability; Pipped; Dead embryos; Post-hatching (juvenile birds); Cripples; Morbidity; Mortality (14-day-old survivors); Weight; Clinical signs.

Application of pesticide (Judge toxicant levels based on field application calculations); Formulation (in corn oil); Method (dietary-acute, capsule, water?); Analytical or bioassay method; Pesticide dosage in food (ppm); Pesticide dosage in bird (mg/kg/day); Stability of pesticide in diet.

References

Cochran, W. G. 1943. Analysis of variance for percentages based on unequal numbers. *Am. Stat. Assoc.* 38:287–301.

Davison, K. L. and J. L. Sell. 1974. DDT thins shells of eggs from Mallard ducks maintained on *ad libitum* or controlled-feeding regimes. *Arch. Environ. Contam. Toxicol.* 2(3):222–232.

Duncan, D. B. 1955. Multiple range and multiple F. tests. *Biometrics* 11:1–42.

Fink, R. J. 1974. Reproductive Impairment Evaluation Parameters. From private report of Truslow Farms, Inc., Chestertown, Maryland.

Heath, R. G., J. W. Spann, and J. F. Kreitzer. 1969. Marked DDE impairment of Mallard reproduction in controlled studies. *Nature* 224(5214): 47–48.

Heath, R. G., J. W. Spann, J. F. Kreitzer and C. Vance. 1972. Effects of Polychlorinated Biphenyls on Birds. Pages 475–485 *in* Proceedings of the XV International Ornithological Congress.

Heath, R. G. and J. W. Spann. 1973. Reproduction and Related Residues in Birds Fed Mirex. Pages 421–435 *in* Pesticides and the Environment: A Continuing Controversy.

Heinz, G. 1974. Effects of low dietary levels of methyl mercury on Mallard reproduction. *Bull. Env. Cont. Toxicol.* 11:386–392.

Kramer, C. Y. 1956. Extension of multiple range tests to groups means with unequal numbers of replication. *Biometrics* 12:307–310.

Longcore, J. R., F. B. Sampson and T. W. Whittendale, Jr. 1971. DDE thins eggshells and lowers reproductive success of captive black ducks. *Bull. Env. Cont. Toxicol.* 6: 485–490.

Prince, H. H., P. B. Seigel and G. W. Cornwell. 1968. Embryonic growth of Mallard and Pekin ducks. *Growth* 32:225–233.

——— 1969. Incubation environment and the development of Mallard embryos. *J. Wildlife Mgt.* 33:589–595.

U.S. Department of Agriculture. 1968. A guideline for Evaluation of Reproductive Effects of Economic Poisons on Avian Species. Washington, D.C. (Exhibit 1)

U.S. Department of Interior. 1974. Test Protocol for Mallard Reproductivity Studies at the Patuxent Wildlife Research Center. Unpublished Document. September, 1974. Laurel, Md. 2 pp.

——— 1974. Test Protocol for Mallard Reproductivity Studies Utilizing a Pair of Birds as the Experimental Unit. Unpublished Document. Patuxent Wildlife Research Center, Laurel, Md. September, 1974. 3 pp.

EXHIBIT 1

A GUIDELINE FOR EVALUATION OF REPRODUCTIVE EFFECTS OF ECONOMIC POISONS ON AVIAN SPECIES

There is strong evidence to indicate that a chemical can be innocuous in terms of direct mortality and yet impair reproductive success. Reproduction studies to evaluate certain parameters of reproductive effects similar to the following may be required.

METHODS AND MATERIALS

1. *Species*. Mallard, as a representative aquatic bird, and either bobwhite quail or ring-necked pheasant as a representative upland game bird. The coturnix quail is not acceptable for reproduction studies.

2. *Age and Sex*. Young adult males and females approaching their first breeding season.

3. *Diet*. Any standard commercial game bird breeder mash is adequate. Matchlings are immediately placed on a clean diet.

4. *Test Plan*. The pen is the basic testing unit. Each pen shall contain 5 females and 2 males except when ring-necked pheasant is the test species. In such case only one male per pen is used.

Birds shall be housed in suitable cages or brooders with water and food provided *ad libitum*. The test chemical (Technical grade) shall be dissolved in edible-grade corn oil prior to incorporation in the ration. If the test material is incompatible with, or insufficiently soluble in corn oil, propylene glycol may be used as the solvent. Concentration of test chemical in the solution shall be adjusted so that the addition of 1 part (by weight) of this solution to 99 parts of the standard commercial gamebird ration will result in the desired concentration (ppm) of test chemical in the finished diet. Ration for control birds is mixed with solvent (free of chemical) in the same ratio.

A completely randomized design is used throughout. The 5 females and male(s) allotted to a pen represent a pen set. Four sets of controls (chemical free diet) are determined concurrently. Two treatment levels are preferred. Each treatment level is replicated in a minimum of four pens.

Treatment	Number of pens (minimum)	Male-female/pen	Number of birds (minimum)
Control	4	2 to 5	28
Test chemical (level 1).	4	do	28
Test chemical (level 2).	4	do	28

5. *Treatment Levels*—When estimating the highest level (level 1) the birds can sustain for the test period some knowledge of the toxicity of the chemical is necessary. The highest non-lethal level (level 1) is estimated, using the data obtained from the LC_{50} determination. A second level 60 percent lower than level 1 is selected. This "safety level" can prove invaluable in the event the higher level proves to be lethal prior to the reproductive period. If, however, a chemical is expected to produce no appreciable mortality at the highest recommended field application rate, it is tested at only 1 treatment level estimated to be two times the highest level birds are expected to encounter in the field.

6. *Data Collection*—The test is started at least two months, preferably three, before the beginning of the first laying season and continued through the reproductive cycle. Eggs are collected daily and stored for two weeks under controlled conditions (16° C and 55 percent relative humidity). Examine eggs and discard those with cracked shells. Begin incubation at two-week intervals. Candle after two and three weeks of incubation to measure embryo survival. Hatchlings are immediately placed on clean diet and observed for 14 days. Record the following data for each pen for every two-week set of eggs and determine the parameters of reproductive success listed below:

(a) Total eggs laid.
(b) Eggs laid per hen per two week period.
(c) Eggs cracked (percent).
(d) Eggs embryonated of eggs set (percent).
(e) Embryos alive at three weeks.
(f) Normal hatchlings.
(g) Chick survival to 14 days (percent).
(h) Fourteen-day chicks per hen.

7. *Analysis*. Analyze measurements by analysis of variance (Cochran, 1943). Pen statistics are weighted according to the number of eggs of hatchlings on which they are based. Apply angular transformations to percentages for analysis and separate means by methods of Duncan (1955) and Kramer (1956). A complete description is required if a different analysis technique is used.

8. *Autopsy*. Autopsy data shall be reported on a representative sample of birds from each treatment group.

9. *Observations*. Birds are observed throughout the study and any abnormal behavior is recorded. Record weights of birds at start and end of test. Estimate as accurately as possible food consumption per bird.

10. *Shell Thickness*. At least 10 percent of eggs from each two-week set shall be reserved for shell thickness measurements. Eggs for shell measurements are selected prior to the incubation period. Shell measurements should be made in accordance with procedure described by Longcore et al. (1971). Store contents of eggs used for shell thickness measurements in glass jars and retain for possible residue analysis. It is not anticipated that egg residue analysis will be required on every chemical, however, when a high percentage of embryo failure occurs and/or significant mortality in 14 day hatchlings, residue analysis will be indicated.

References

Cochran, W. G. 1948. Analysis of variance for percentages based on unequal numbers. American Statistical Association. 38:287–301.

Duncan, D. B. 1955. Multiple range and multiple F tests. Biometrics. 11:1–42.

Kramer, C. Y. 1955. Extension of multiple range tests to groups means with unequal numbers of replication. Biometrics. 12:307–310.

Longcore, J. R., F. B. Sampson and T. W. Whittendale, Jr. 1971. DDE thins eggshells and lowers reproductive success of captive black ducks. Bulletin of Environmental Contamination and Toxicology. 6:485–490.

PROTOCOLS FOR LABORATORY ACUTE DERMAL TOXICITY TEST

The following methods can be used to assess dermal hazards of pesticides to wild avian species if it is required by the Environmental Protection Agency.

Protocol #1 is a method that has been used by Schafer *et al.* (1973) to determine the acute dermal LD-50's of pesticides on some wild and domestic birds. This method can be used successfully to determine dermal toxicity of pesticides for most wild and domestic birds that can be conveniently held in captivity.

Protocol #2 was specifically designed for use on Mallards but could be used without any problems on most waterfowl that can be held successfully in captivity (DWRC Annual Reports—manuscripts in preparation).

Both of these methods as published are very general as to how to conduct a dermal LD-50 except for the part on how the birds were dermally treated. Therefore, the majority of the protocol for these methods is a repeat of the acute oral recommended protocol except for the parts that pertain to actual treatment of the birds (See Protocol entitled: Protocol for Laboratory Acute Toxicity).

METHODS #1 AND MATERIALS

Species and history. Almost all species of birds that can be successfully held in captivity can be used with this method.

A history, as complete as possible, of rearing practices such as photoperiod, medication, type of food, etc., should be included in the report.

All lots of birds should be healthy and uniform and without deformity. All lots should be weighed, then held for a minimum of 14 days. If done indoors, temperature and humidity should be controlled. Any lots of birds that suffer an abnormal weight loss or above 10 percent mortality during the holding period should be discarded.

The test room should also have controlled temperature and humidity as well as freedom from drafts and sudden noises which could disturb the test birds.

Cages. All birds shall be individually caged, to meet acceptable animal husbandry practices.

Weight. All birds must be weighed, in grams, at the beginning of the test, and on days 3 and 14 after treatment. Also, birds should be weighed at termination of the test if it extends beyond 14 days.

Diet and fasting. All birds shall have free access to feed and water throughout the test. The diet fed must be a standard feed ration known to be adequate for game birds and without antibiotics.

Feed consumption shall be determined weekly for treated and control birds. The feed consumed must be reported as average daily food consumption for each treatment level.

Administration of test material. Acetone solutions should be prepared so that the total amount administered (in µl) equals 2 times the bird's weight (in g). If the pesticide is not soluble in acetone, any nonhazardous volatile solvent is acceptable. Acetone solutions should be applied with a syringe having a 21-ga, 2.5 cm needle whose tip has been squared and polished to avoid abrading the skin. The solution should be slowly applied to an area 1 cm^2 in the sparsely feathered skin area covering the pectoralis muscles under one wing joint. The acetone should be evaporated by a current of air.

Number of Birds per Dose Level. The number of test birds per treatment level shall be no less than 4 of each sex. The number of control birds shall be no less than 4 of each sex.

Dosage-mortality data. The factor between dosage levels used to determine the acute LD-50 should be based on a geometric or logarithmic scale. There should be a minimum of 4 dosage levels used in calculating the acute dermal LD-50.

The determination of an acute dermal LD-50 shall follow any acceptable method. Two examples of acceptable methods are Thompson and Weil (1952) and Litchfield and Wilcoxon (1949).

Period of observation. The test animals shall be observed until death or for a minimum of 14 days. The observation period should be longer if signs and toxicity are still evident. The time of all deaths shall be recorded by day. If 10 percent or more of the control birds die during the test period, the test shall be considered invalid.

Recording of signs. All signs of intoxication shall be recorded as they occur. Also, the area treated should be checked to determine if any dermal irritation occurs.

REPORTING OF DATA

Should include pertinent information on the items listed below. The metric system should be used for units of measure. Dates of test; Species and rearing history; Source of birds; Age and sex; Body weights; Diet used; Pen dimensions; If pen indoors or outdoors; Controlled temperature and humidity if indoors; Weather condition, if outdoors; Feed consumption; Preparation of test material; Method of administration.

Amount of test material dermally applied per bird; Amount of diluent used per treated bird; Number of birds per treatment level; Number of controls employed; Method used for calculating LD-50; Length of observation period; Time of mortalities; Record of all signs of intoxication.

The determined LD-50 and the confidence limits shall be reported in the following manner: Test Chemicals and Purity or Formulation; Bird Species and Sex; LD-50 in mg/kg (Confidence Limits).

Additional Data. Necropsies could give valuable additional data, but are not necessarily required. When necropsies are conducted, they should include a general inspection of the digestive tract, liver, kidneys, heart and spleen at the time of death and at the termination of the test for both control and test birds. Any gross pathological changes should be reported if necropsies are performed.

References

Litchfield, L. J. and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect expirements. *J. Pharmacol. Exp. Theo.* 96(2): 99–133.

Schafer, E. W., R. B. Brunton, N. F. Lockyer, and J. W. DeGrazio. 1973. Comparative toxicity of seventeen pesticides to the quelea, house sparrow, and red-winged blackbird. *Toxicol. Appl. Pharmacol.* 26: 154–157 (See page 155).

Thompson, W. R. and C. S. Weil. 1952. On the construction of tables for moving average interpolation *Biometrics* 8: 51–54.

METHOD NO. 2 AND MATERIALS

Species and history. This method can be used on all species of waterfowl that can be successfully held in captivity.

A history, as complete as possible, of rearing practices such as photoperiod, medication, type of food, etc., should be included in the report.

All lots of birds should be healthy and uniform and without deformity. All lots should be weighed, then held for a minimum of 14 days. If done indoors, temperature and humidity should be controlled. Any lots of birds that suffer an abnormal weight loss or above 10 percent mortality during the holding period should be discarded.

The test room should also have controlled temperature and humidity as well as freedom from drafts and sudden noises which could disturb the test birds.

Cages. All birds shall be individually caged, to meet acceptable animal husbandry practices.

Weight. All birds must be weighed, in grams, at the beginning of the test, and on days 3 and 14 after treatment. Also, birds should be weighed at termination of the test if it extends beyond 14 days.

Diet and fasting. All birds shall have free access to feed and water throughout the test. The diet fed must be a standard feed ration known to be adequate for game birds and without antibiotics.

Feed consumption shall be determined weekly for treated and control birds. The feed consumed must be reported as average daily food consumption for each treatment level.

Administration of test material. The crura of the birds should be shaved with an elastic animal clipper to facilitate taping of the plastic bags with adhesive tape. The pesticide should be dissolved in table-grade corn oil. If it is insoluble in corn oil, then either propylene glycol or distilled water can be used as the diluent. Appropriate amounts of the pesticide should be dissolved in the diluent so that approximately 0.6 ml of the solution is applied to each foot. The area covered on each foot should include the tarso metatarsus, phralanges, and the webbing. The feet should then be covered with a 4 in. x 6 in. plastic bag 0.010 in. thickness, which extends midway up the crus. This exposure should be continued for 24 hr, at which time the bags should be removed and the feet washed with a mild soap and warm water.

Number of birds per dose level. The number of test birds per treatment level shall be no less than 4 of each sex. The number of control birds shall be no less than 4 of each sex.

Dosage-mortality data. The factor between dosage levels used to determine the acute LD–50 should be based on a geometric or logarithmic scale. There should be a minimum of 4 dosage levels used in calculating the acute dermal LD–50.

The determination of an acute dermal LD–50 shall follow any acceptable method. Two examples of acceptable methods are Thompson and Weil (1952) and Litchfield and Wilcoxon (1949).

Period of observation. The test animals shall be observed until death or for a minimum of 14 days. The observation period should be longer if signs of toxicity are still evident. The time of all deaths shall be recorded by day. If 10 percent or more of the control birds die during the test period, the test shall be considered invalid.

Recording of signs. All signs of intoxication shall be recorded as they occur. Also, the area treated should be checked to determine if any dermal irritation occurs.

REPORTING OF DATA

Should include pertinent information on the items listed below. The metric system should be used for units of measure. Dates of test; Species and rearing history; Source of birds; Age and sex; Body weights; Diet used; Pen dimensions; If pen indoors or outdoors; Controlled temperature and relative humidity, if indoors; Weather condition, if outdoors; Feed consumption; Preparation of test material; Method of administration; Amount of test material dermally applied per bird; Amount of diluent used per treated bird; Number of birds per treatment level; Number of controls employed; Method used for calculating LD–50; Length of observation period; Time of mortalities; Record of all signs of intoxication.

The determined LD–50 and the confidence limits shall be reported in the following manner:

Test chemicals and purity or formulation.	Bird species and sex.	LD–50 in milligrams per kilogram (confidence limits).

Additional Data. Necropsies could give valuable additional data, but are not necessarily required. When necropsies are conducted, they should include a general inspection of the digestive tract, liver, kidneys, heart and spleen at the time of death and at the termination of the test for both control and test birds. Any gross pathological changes should be reported if necropsies are performed.

References

Litchfield, L. J. and F. Wilcoxon. 1949. A simplified method of evaluating dose-effect experiments. *J. Pharmacol. Exp. Theo.* 96(2):99–133.

Thompson, W. R. and C. S. Weil. 1952. On the construction of tables for moving average interpolation. *Biometrics* 8:51–54.

Exhibit 1—Denver Wildlife Research Center Annual Report (a copy presented on next pg).

EXHIBIT 1

PERCUTANEOUS: MALLARDS

Two groups of four hens each were employed. They were 20–23 weeks old and weighed 1.188 (0.919–1.404) kg. The crura of the hens were shaved to facilitate taping of the plastic bags. The chemical was dissolved in water which was then applied in the appropriate amounts to both feet of each bird. Approximately 0.6 ml of solution was applied to each foot. The area covered included the tarso-metatarsus, phalanges, and webbing. The feet were then covered with a plastic bag which extended midway up the crus. This exposure was continued for 24 hours, at which time the bags were removed and the feet washed with "Ivory" soap and warm water. Survivors were observed for 14 days before sacrifice.

PROTOCOL FOR SMALL PEN SIMULATED FIELD TEST TO EVALUATE PESTICIDE HAZARDS TO BIRDS

This protocol has been developed as an initial simulated field test for Bobwhite. With modifications, other species could be tested. This method exposes the test animals to field applications of the chemical. Exposure will not necessarily be similar to that of free-ranging animals.

METHODS AND MATERIALS

Birds. Test subjects shall be obtained from pen-reared stock. All birds shall be maintained in outdoor pens, in the general area where the field test is to be conducted, for at least 2 weeks prior to being placed on test.

Each test shall involve not less than 6 pairs of birds per control group and not less than 6 pairs of birds per test group, with 1 pair of birds per pen. It is recommended that at least 12 additional birds be procured and held in outdoor pens for replacement purposes.

Pens. Each pen shall contain approximately 20 sq ft (4 ft x 5 ft x 12 in. or 3 ft x 7 ft x 12 in., inside measurement), and is to consist of a 2 in. x 2 in. wooden frame covered on the inside with ½ in. mesh hardware cloth. To avoid possible contamination, scrub wire and replace frames if pens have been used for previous testing. Use of aluminum tubing for framing will make cleaning of pens easier. Pen height may be increased from 12 in. to a height that will accommodate vegetative growth through the test period.

Do not cover pen bottom, stake pen securely to the group to minimize predation. Move pens daily, or as required to maintain adequate vegetative cover. Pens should have an opening through which birds can be removed and added. Each pen is to contain a poultry waterer (preferably a 1-qt chick fount) and a small box (open on 1 side, 12 in. x 12 in. x 8 in. high), to serve as a shelter for the birds.

Test conditions. Conditions for evaluation of each pesticidal formulation should approximate those to be encountered in the routine use of the product. Evaluation of a cotton insecticide should be made in a cotton field, and the timing, rate, number, and manner of applications should be identical with those used for control of cotton insects. Similarly, products for control of grass or alfalfa insects should be tested in hay fields, pastures, or meadows. Pens of "control" birds are to be placed in similar habitat not subject to application of the pesticide, with subsequent handling (feeding, watering and observation) the same as for test birds. Clearly mark all pens and all birds to facilitate accuracy in reporting.

Care should be taken at all times to avoid possible contamination through drift from adjacent areas or from improper cleaning of equipment.

Test procedures. Pens and shelters are to be placed in position and birds (1 male and 1 female per pen) introduced prior to application of the pesticide. Also preceding the pesticide application, place filled waterers and approximately 3 oz of cracked corn, wheat or other grain (scattered on the ground) in ½ of the total test and control pens used. The remaining test and control pens are to be left without feed and water for 12 hrs after the pesticide application, at which time feed and water is to be introduced to these pens, as above. Sufficient food and water is to be available to the birds at all times, other than during the indicated 12-hr period.

Follow all safety precautions, as specified on the product label, when entering the treated field.

If either member of the pair dies, the survivor is to be removed, placed in an individual holding pen, and a fresh pair placed in the pen. The survivor should be observed until death or for 14 days. Sacrifice survivors, including "control" group and birds held for replacement, at termination of the experiment.

Duration of test. For pesticides which are to be applied once per season, tests are to be continued for not less than 14 days. For pesticides which are to be applied more than once per season, tests are to be continued for 14 days after the final application, with movement of pens immediately prior to each application.

Reporting of data. Appropriate items to be considered are as follows: Location; Dates; Weather Data; Species; Source; Age; Medical and Chemical Administration History; Body Weight Changes; Individual Identification; Chemical Formulation; Rate of Application; Manner of Application; Vegetative Cover; Residue Analysis; Pen Description; Pen Placement; Diet; Food and Water Supply Schedule; Feed Consumption; Visual Signs of Intoxication; Clinical Measurements for Intoxication; Accidental Deaths or Injuries; Replacement Schedule; Gross Pathological or Histological Examinations; Statistical Methods.

Protocol for Large Pen Simulated Field Studies

For assessing the hazards of pesticides to Bobwhites and Ring-necked pheasants, large cages enclosing portions of habitat of 0.005 ha (500 ft^2) or more may be utilized. With modifications, other species can also be tested by this method. Tests utilizing large pens may be conducted for pesticides to be applied on cropland, rangeland, or wildlands or for other outdoor applications such as roadsides, rights-of-way, "waste areas," or other known wildlife habitats. This type of test is not a substitute for full-scale field studies. Pesticides tested in small pens and/or in the large pens may not show effects at as low levels as in actual field operations and thus tend to underestimate the hazard to birds. This is primarily due to two reasons (1) bird exposure to pesticides differs between pen situations and a free environment where they can feed heavily on dying invertebrates (and drink contaminated water etc.) and (2) small, active, insectivorous and omnivorous birds are often more vulnerable to pesticide poisoning than Bobwhites or Ring-necked pheasants, the species used in the tests.

The objective of simulated field tests is to determine pesticide effects on birds under seminatural conditions and to assess the degree of hazard presented by the formulations and application rates of pesticides being considered for registration. Simulated tests can be conducted at less cost and with more control of important parameters and variables than full-scale field studies.

Many pesticide-wildlife studies utilizing penned birds or mammals have been conducted by conservation agencies, industry, and universities. However, most have been specific, one-time studies that apply to a particular field situation. An exhaustive review of these would not add much to development of a general protocol. The Michigan (Black and Zorb 1965, Heezen 1973, Zorb 1968) semifield method, which is the model for this protocol, was developed by a cooperative effort of several agencies and was used to evaluate a number of pesticides over a period of years.

METHOD AND MATERIALS

Pens. Wire-covered pens should be constructed covering a minimum ground area of 0.005 ha (500 ft^2) per pen. Suitable pen dimensions might be 3.1 or 3.7 m by 15.2 or 22.9 m (10 ft or 12 ft by 50 ft or 75 ft), with the top cover at a height of about 2.0 m (6.5 ft). Other dimensions covering 0.005 ha (500 ft^2) or more per pen may be used. Metal flashing should be placed around all pens to a height of 45.7 cm (18 in.) above ground and to a depth of 15.2 cm (6 in.) below the ground surface.

The number of pens needed to test one chemical is 24 to 36. This would provide 6–9 untreated (control) pens and 6–9 pens for each of 3 treatment levels (the proposed treatment rate and 2 multiples of that rate such as 3 or 5 x and 5 or 10 x). An independent water supply and a small shelter should be furnished in each pen.

Before pens are planned and constructed, the designer and builder should consult wildlife agencies and successful game farms to learn practical considerations such as prevention of parasites and disease, soil drainage requirements, support of top cover to prevent collapse under the weight of snow, types of watering equipment, etc.

Birds. Pens may be stocked with 1 mated pair of Bobwhites per pen. One-year-old birds of known history, not previously exposed to pesticides, shall be placed in the pens at least 2 weeks prior to the pesticide applications. A supply of replacement Bobwhites should be maintained in outdoor pens near the test pens. If either member of a test pair dies, the survivor should be removed and held for observation and a fresh pair placed in the test pen. For practical purposes, a limit should be set on the period of time and number of replacements used.

When pheasants are utilized in this protocol, the pens should be constructed so that removal of one cross-fence would double the pen size, for example, two 3.7 x 22.9 m (12 ft x 75 ft) pens could be converted to one 3.7 x 45.7 m (12 ft x 150 ft) pen. If pheasants are used as the test species, the stocking rate should be 1 male and 5 females per larger pen.

Test conditions and procedures. It would be desirable to use movable pens that can be set up over the crop or vegetation on which the pesticide would be applied, if registered. If permanent (nonportable) pens are used, then the soil should be suitable for growing the pertinent crop or vegetation. The pesticide should be handsprayed with precision at the same rate, timing, number of applications, and formulation as the proposed registration. Replicate pens should also be treated at two multiples (such as 3 or 5 x and 5 or 10 x) of the petition rate. Spraying should be done under minimum wind conditions and with protective shielding to prevent contamination of adjacent sprayed pens and/or control pens. For statistical purposes, it is best to randomize the test pens, but because of the drift problem, it may be better to first stratify the treatment pen locations.

In addition to applying the pesticide in the pens at the proposed rate and 2 multiples of that rate, feed and water should also be treated at the 3 rates. The food treatment rates can be based on results of residue studies required for other purposes in the registration procedure. Treated food (toxicants should be carried in a table grade corn oil, not in dry form or in a repellent solvent) should be prepared within 1 day of the time the pen environments are sprayed. Treated food should be supplied daily or every other day to the test birds in feeders protected from the weather. Food and water treatments should be made with procedures and rates that are consistent with the characteristic of the chemical and the usage being tested. Another desirable phase of the test would be to provide treated animal foods such as grasshoppers or other invertebrates (earthworms, etc.) to the penned birds simultaneously with the pen environment applications.

If it becomes necessary to determine the major route of pesticide exposure to the test animals, then various combinations of treatments can be made. For example, treatments (with adequate replicates) might include (1) pen environment only with "clean" food and water, (2) "clean" pen environment and water with treated food only, (3) "clean" pen environment and food with treated water only, or (4) other combinations.

Birds in half the pens at a given treatment rate may be fasted and water withheld for 12 hours prior to the pesticide applications. If so, half the control pens should also be fasted and not allowed access to water fountains for the same 12-hour period.

All pens should be numbered and locations mapped or charted. Daily records should be kept of observations, toxic signs, test bird deaths and replacements (if any), complete data on pesticide formulations, application rates and methods, weather conditions and all other data of value in assessing the hazard to birds (see check list).

Reproductive success of the test birds may be determined. This should be done during the year of the test (and again 1 year post-treatment with survivors if residues of the test chemical are known to be persistent).

Eggs may be picked up periodically for artificial incubation and rearing of young in the first half of the breeding season but eggs may be left for the hen(s) to incubate in the last half of the normal breeding season. Hens should be allowed to rear the young to 14 days of age in the test pens.

The duration of the test should be a minimum of 21 days after the final pesticide application (longer if any birds are showing toxic signs or other effects). Reproductive tests would of course continue beyond 21 days posttreatment.

Pesticide residue determinations may be added to support the study throughout. Diet and water levels of the test chemicals should be confirmed. Vegetation, soil, and other environmental samples may be analyzed for residues in accordance with other label requirements and to determine persistence and bioaccumulation. Test birds poisoned by the pesticide and a sample of surviving birds should be analyzed for residues in selected tissues. Gross pathology may be determined at the same time.

REPORTING OF DATA

The final report must include:

An introduction and background information.

Proposed use of the pesticide and related data such as vegetation or crop(s), formulation(s), and rate(s) of application.

TEST METHODS AND MATERIALS

Test animals and their history; Test pen description; Test animals—food and handling; Pesticide formulation(s) and application(s); Statistical methods; Weather data collection; Analytical methods for residue determinations; Clinical data methods; Reproductive study methods; Other methods utilized.

RESULTS

Mortality—number, dates, etc.; Toxic signs; Weight changes; Food consumption; Clinical observations; Necropsy Observations; Residue analysis results; Weather data and inclusive dates of test; Reproduction test(s) results.

SUMMARY AND CONCLUSIONS

Potential hazards to wildlife should be identified in addition to toxicity results per se; Tables; References.

References

Black, C. T. and G. L. Zorb. 1965. Effect of malathion sprays on penned pheasants. Mich. Conserv. Dept. Research and Develop. Rpt. No. 34.

Heezen, K. L. 1973. Pesticide effects on pheasants. Job Complet. Rept. Proj. No. W-118-R-6, Job No. 119.1 Mich. Dept. Conserv. 21 p. (Mimeo)

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EXHIBIT 1

MICHIGAN DEPARTMENT OF CONSERVATION

(Research and Development Report No. 34 June 18, 1965)

EFFECT OF MALATHION SPRAYS ON PENNED PHEASANTS[1]

(By C. T. Black and G. L. Zorb)

Summary

Malathion in water solution, sprayed at many times the rates normally used in agriculture, apparently does not harm pheasants. Spraying of penned, nearly grown, young pheasants with malathion in water solution, at rates of one, five, and ten pounds per acre, did not produce any apparent harmful results. The following spring there was no apparent decline in egg production among any of the sprayed birds. Eggs from the sprayed birds showed normal hatchability, and chicks from these eggs survived normally to an age of three weeks, by which time abnormalities usually develop. An attempt to determine effect of malathion on pheasants, their eggs, and young, from nesting in 12 feet by 250 feet pens, failed because the pens were too small to permit normal nesting.

* * * * *

Introduction

The prospect of the use of the insecticides malathion and sevin to control the newly invading cereal leaf beetle in Southwestern Michigan in 1963 raised some important questions as to the impact of such a program on wildlife. While it was suspected that these chemicals would not be harmful, there was strong reason to suppose that both insecticides would be relatively safe. Still, there was more evidence at that time regarding sevin; not so, malathion. Consequently the Patuxent Wildlife Research Center of the Bureau of Sports Fisheries and Wildlife of the United States Department of Interior requested the Michigan Department of Conservation to make certain field observations in the spray area and to conduct experiments on confined birds.

This report presents observations on an experimental spraying of penned ring-necked pheasants with malathion. This study was financed through the Patuxent Wildlife Research Center. The pens and supervision were furnished by the Michigan Department of Conservation. Special thanks are due to Martin Pollok, the experienced, painstaking superintendent of the State Game Farm, without whose incessant care this project could not have been undertaken. Certain other phases were financed by Federal Aid in Wildlife Restoration Project W-40-R.

Specifically, it was our intent to subject pheasants in an artificial penned situation to as nearly the same spray they would have received in the wild—malathion in aqueous solution at a rate of one pound per acre. We also desired to subject them to sprays many times that rate to determine the effect to excessive rates such as might result from accident, or deliberate heavy application by an over-enthusiastic farmer. Also these heavy rates offer certain advantages in interpreting experimental results. For this purpose we selected rates of five and ten pounds per acre. The most artificial aspect, besides the penned environment, was the time of year when we were forced (by circumstances beyond our control) to undertake the experiment. Our birds were sprayed in mid-September; the normal time of cereal leaf beetle control is late April and May. However, we feel that there are certain indications from this experiment that malathion may be a relatively safe insecticide where the important game bird, the ring-necked pheasant, is concerned.

Methods

Pens; Placement of Birds. Sixteen new pens (12 feet by 150 feet) constructed at the State Game Farm at Mason, Michigan during the summer of 1963 alongside 20 pens already there made available a battery of 36 pens. Aluminum flashing between all pens 18 inches high and buried about six inches in the ground prevented run-off between pens and excessive fighting between cocks. Pheasants purchased from a private breeder were banded and released in the pens (one male and five females per pen, plus some surplus birds) on September 1, 1963. Eight birds died upon flying into the fence between that date and the application of spray. The surplus birds enabled keeping the pens fully stocked at the time of spraying, with the few extra birds split up among the control pens.

Experimental Design. The pheasants were subjected to different concentrations of malathion—one, five, and ten pounds per acre. This gave nine pens (nine males and 49 females) for each treatment and nine pens for a control. While ten pounds per acre is far above the general rate of field application this three-level application might help to interpret results. For example, if few or no deaths occurred under the ten pound treatment, a few possible deaths in the lower dosages could be blamed on other causes.

Pens for the various treatments were selected at random within blocks of four pens each. The 20 old pens had rank cover or quackgrass and weeds, while the cover in the 16 new pens had been clipped and trampled during pen construction so that there was much less natural cover. There was also some difference in the slope between portions of the pen area. The systematic selection of blocks prevented the possibility of all birds under one treatment falling in the same cover type of slope. Selection of treatments within blocks was done at random.

Application of Spray. The insecticide was applied with a new John Bean "Trojan" ten-gallon sprayer. After a little practice, the 12 feet by 150 feet area (1800 square feet) could be sprayed and the tank emptied in one trip.

Two polyethylene panels (six feet by twelve feet) held on each side of the pen and carried in adjoining pens, prevented drift during the application. In actual operation, even with some wind, holding the nozzle (on its 15 feet hose) close to the ground eliminated danger of drift. The aluminum flashing on the sides of each pen were sufficient to limit drift at the pen edge.

Malathion was applied on September 19. At each pen the water was poured from ten-gallon cans into the sprayer, the malathion added, the motor started to facilitate mixing. The sprayer was then taken to the far end of the pen to start the spray, and worked back to the gate. The pheasants all received some direct spray.

Water cans and food trays were removed from the pens before spraying. A supply of ear corn, enough to last a month, was placed in each pen and scattered in an area of short grass. Even the old pens had a trampled area where the aluminum flashing was installed, so that the corn was not protected by tall grass or weeds. The corn was not turned over during spraying; perhaps a third of the kernels on the under side of the ears was not directly sprayed. The corn received the spray in the same manner as the rest of the pen.

In a few cases where the timing was not exact and some spray remained when the end of the pen was reached, the tank was run out back into the pen. No extra solution was sprayed on the corn. It required the full day to spray all 27 pens. No birds were lost due to the extra disturbance of the sprayer and crew. Fresh water was provided after the spray was completed.

Autopsy Procedure. Dr. L. D. Fay, Game Section Pathologist, autopsied 36 hens from the experimental pens (9 hens from controls and 9 from each treatment) on September 25 and October 10 and 18, or 6, 21, and 29 days after spray, respectively. The hens to be autopsied were picked at random—first by pen, then by individual bird. Only one hen was taken from each pen, so once selected a pen was no longer available for choice.

Birds were killed by injecting 2-3 ml. of a solution of sodium pentobarbitol into the heart a few minutes before examination. Dr. R. K. Ringer, an avian physiologist from Michigan State University, collected certain endocrine glands for histological examination and observed the general autopsy. The control birds were examined first to observe the normal organs. Procedure was to (1) examine externally for lesions and mass parasitism; (2) skin out carcass and observe general condition of musculature; (3) remove breast to expose abdominal and thoracic organs in their natural position; (4) examine heart, lungs, air sac membranes, liver, spleen, intestine, ovary, and kidneys, for color, size, and pathologic lesions and other abnormalities; (5) split trachea, crop, gizzard and intestinal tract; wash and examine sediment grossly for parasites; and make smears of intestinal contents and examine under microscope; (6) remove liver and spleen intact from most birds and weigh, and take samples of liver, spleen and kidney for sectioning.

Handling of Eggs and Chicks. The experimental birds sprayed as described above were over-wintered in four pens containing corn shocks for shelter. The birds from each spray treatment were kept separated and in pens that had been sprayed with their particular treatment. Higher protein food was furnished to all birds in late winter. Eggs were collected from these birds between April 27 and May 7 and placed in an incubator on May 11. On May 18 the incubating eggs were candled and infertile eggs or those containing dead embryos were removed. The eggs hatched on June 1. All the eggs which failed to hatch were examined and cause of failure classified as (1) infertile, (2) embryo dead, noting approximate age at death, or (3) egg pipped but failed to hatch. The chicks were held for three weeks in 12 brooder houses with 18 to 27 chicks per house. There were three houses for chicks from each of the four treatments. Survival of chicks was noted, and their development and growth closely watched to see if any abnormalities resulted from the malathion.

Spraying Breeding Birds. After the egg collection was complete we put a male and female from the control lot (not sprayed with malathion the preceding fall) in each of 24 pens and sprayed alternate pens and food supply with malathion at the rate of 5 lb. per acre. These birds were then permitted to nest. However, excessive harassment by the males and injury to several hens resulted in our removing most males and rotating a few males through the pens. Regular observations were made as to the progress of nesting and the number of broods produced by the sprayed and normal birds.

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[1] Contribution from Pittman-Robertson Project W-40-19, Michigan.

Findings

Late Summer Spray on Young Birds—Immediate Effect. No birds died and there was no apparent change in the appearance or activity of any of the birds following the experimental spraying with malathion sprays. The autopsy of three hens from the control group and from each treatment on the 6th, 21st, and 29th day following the spray (12 birds each date) showed no differences between the controls and the birds exposed to malathion. Nor were there gross differences among the controls and the pheasants exposed to the different rates of malathion. Specifically, there were no gross pathological lesions attributable to malathion.

The liver and spleen were saved and sections mounted. Examination revealed no differences between controls and experimental birds. We also have slides of the brain, and pituitary, adrenals, thyroid and thymus glands. Examinations are not complete, but no indications of damage so far have been detected.

A few birds died in the pens during December. Two of these were found when fresh enough to autopsy. One had a broken neck and the other a broken leg. Birds were disturbed by wild cocks flying onto and from the tops of the pens, and apparently flew into pen wire with occasional fatal results.

Reproduction in Following Spring. Malathion appeared to have no effect on pheasant reproduction in experimental birds sprayed (birds, food and pen) at the rates of 1, 5, and 10 lb. of malathion per acre about eight months prior to the breeding season. Experimental birds fared as well as or better than the control birds in egg production, egg fertility, hatchability, and survival of chicks:

Treatment	Eggs collected per hen	Percent of infertile eggs	Percent of fertile eggs		
			Dead embryos	Chicks dying after hatching	Chicks surviving to 3 weeks
Control	2.1	9	20	11	69
1 lb/acre	2.8	7	30	1	68
5 lb/acre	2.4	2	22	8	71
10 lb/acre	2.6	2	11	2	84

Egg Production. There was no apparent decline in egg production in birds experimentally sprayed with malathion, when compared to the controls. Since egg collections were made from large pens that contained shocked corn for winter cover, some eggs could have been missed. Each pen contained about 36 hens and the collection figures give at least an indication of production.

Treatment	Number of hens	Number of eggs	Eggs per hen
Control	37	77	2.1
1 lb/acre	36	102	2.8
5 lb/acre	34	81	2.4
10 lb/acre	35	90	2.6

Egg Fertility and Dead Embryos. The eggs were candled on May 18, one week after incubation began, and the infertile eggs and those with dead embryos were removed. At this time the eggs from the control birds and those from the 1 lb. treatment of malathion had greater losses than the 5 and 10 lb. groups.

On June 1, when most eggs hatched, the eggs which failed to hatch were examined and the dead embryos were aged. Embryos from the 1 and 5 lb. groups had suffered the greatest loss:

Treatment	Stage of incubation					Total loss from all eggs	
	At 7th day			8th to 22d day		Number	Percent
	Number of eggs	Infertile	Dead embryos	Dead embryos	Pipped but died		
Control	77	7	6	4	4	21	27
1 lb/acre	102	7	7	18	4	36	35
5 lb/acre	81	2	2	13	2	19	23
10 lb/acre	90	2	3	6	2	13	14

Embryo loss was greatest in the 1 lb. experimental birds, and all experimental birds suffered heavier losses at the later stages of incubation than did controls. However, the eggs from the 10 lb. birds had the highest fertility rate and the lowest loss of embryos; this would seem to preclude damage from malathion.

	Age of dead embryos in days						Pipped but died	Loss of fertile eggs	
	1 to 7	8 to 10	11 to 13	14 to 16	17 to 19	20 to 22		Number	percent
Control	6	2	0	0	1	1	4	14	20
1 lb/acre	7	4	2	1	5	6	4	29	30
5 lb/acre	2	0	3	2	3	5	2	17	22
10 lb/acre	3	0	0	0	0	6	2	11	12

Survival of Chicks. Chicks from each treatment were placed in brooder houses (from 18 to 27 chicks per house) and raised to an age of 3 weeks. The controls suffered heavier losses than did experimental birds. Our game farm manager noted nothing unusual in the losses that occurred. Loss was from picking, occasional runts, and a few deformed birds.

Treatment	Pen No.	Number of chicks	Total chicks in treatment	Died to 3 weeks		
				Number per pen	Total	Percent
Control	7	19	56	4	8	14
	8	18		2		
	10	19		2		
1 lb/acre	4	22	66	0	1	2
	5	22		0		
	6	22		1		
5 lb/acre	11	22	62	2	6	10
	12	21		3		
	14	19		1		
10 lb/acre	1	27	77	1	2	3
	2	25		1		
	3	25		0		
All experimental Birds			205		9	4

Spring Spray on Breeding Birds. We were unable to evaluate the effects of a 5 lb. per acre application of malathion applied to birds during the breeding season. Nesting was not successful in the 24 pens each containing a pair of birds. The cock harrassment of the hen was a major problem. Most of the cocks were removed and the remaining ones alternated between pens so that the hens would have an opportunity to begin nesting but still insure fertility. Nine hens died from accidents or from injuries from the cock, nine hens raised no brood, and six hens hatched clutches. The six successful clutches produced only 12 chicks.

EXHIBIT 2

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

State of Michigan
Project No.: W-118-R-1
Job No.: 4
Period Covered: July 1, 1967, to June 30, 1968
Name: Farm Game Management Research
Title: Effects of Pesticides on Wildlife

Abstracts. Simulated field applications were made of phorate and phosphamidon on ring-necked pheasants confined in .04 acre pens (12 ft x 150 ft). The phorate granules were spread evenly over the entire pen area, including the food. Phosphamidon was applied evenly in a 10-gallon water mixture over the entire pen including the food supply. We made no attempts to spray or to avoid spraying the pheasants. Many of the birds received some direct spray but none were heavily sprayed. This is the same procedure we have followed in our tests of five other organophosphate insecticides.

Phorate was applied twice, three weeks apart, at ½ and 3 pounds per acre rates. Phosphamidon at ½ pound per acre was applied twice (a month between applications), and applied only once at a 3 pound per acre rate. Surviving birds were held over winter and eggs collected and hatched, and the chicks held for two weeks to check reproductive success.

Under our experimental procedures phorate was not dangerous to pheasants. One bird dead four days after the initial application of phorate at 3 pounds per acre, was the only bird to show any ill effects out of the 60 experimental birds subjected to the two applications of this granular pesticide. No adverse effects on reproductive success were discernable in the treated birds the following spring.

Phosphamidon at a rate of 3 pounds per acre had serious effects on the birds. Nine birds died and 18 of the remaining 21 birds became immobilized under the 3 pound rate. The sick birds probably would not have survived under natural conditions resulting in a possible 90 percent mortality from this rate of phosphamidon. After two applications of phosphamidon at ½ pound per acre, four birds became sick after the first application, but there were no deaths and no other ill effects.

The surviving birds from both treatments had the same reproductive success as the control birds when checked the following spring.

Modified spray treatments. As a further check on just how the birds in our pens were receiving an organo-phosphate pesticide, we sprayed diazinon at a rate of 5 pounds per acre in three modifications of exposure of the pesticide to the birds. In three pens only the food was sprayed, in three pens only the birds were sprayed and in three pens the birds and food were introduced immediately after the entire pen was sprayed. Two pens were sprayed with the birds and food in the pen, following our standard spray procedure.

There was almost complete mortality in the "food only", "birds only", and the "normal" spray applications. Where only the environment was sprayed there was no effect at all on the birds. Either contaminated food or direct spray killed the birds but a freshly sprayed environment had no effect. Apparently the diazinon must be oral, dermal or respiratory, rather than through casual exposure. The 5 pound rate of diazinon sprayed pens with birds and food in them had much more effects on the pheasants than our tests, conducted in the same manner two years ago. This year we had 100 percent mortality, compared to 40 percent mortality in the previous test. We have no explanation for this difference. It would be beneficial if we could set up future experiments with modified spray treatments to indicate more clearly the manner of transmission of the pesticide to the birds.

Recommendations. Continue to test nonpersistent pesticides on penned pheasants. Make selection of test materials after discussion with State and Federal authorities so that the work will be done with the chemicals that are the most important to Michigan or to the pesticide situation as a whole. Work toward a testing procedure that can be utilized as a standard of "simulated field tests" everywhere in the country.

Objectives. To study the effects of insecticides on game birds and mammals and all other wildlife under field and pen conditions.

Techniques used. During August and September of 1967 we checked the effects of phorate (Thimet) and phosphamidon on pheasants under simulated field conditions. Phorate (10 percent granular on attapulgite) was spread on .04-acre pens with a hand windmill seeder at the rates of ½ and 3 pounds per acre. Phosphamidon, in a 10-gallon water mixture, was sprayed at these same rates. There were five pens, each with six birds (1M 5F), for each treatment plus five pens of control birds. The birds received no direct contact with phorate, but it was spread on and around their food supply and over the entire area of the pen. In order to assure even coverage with the phorate we added additional attapulgite of a similar mesh size for filler. With the liquid mixture of phosphamidon we made no attempt to spray, or to avoid spraying the birds directly. A few birds in each pen received some direct spray. Phorate was applied twice (August 5 and 28). Phosphamidon was applied twice at the ½-pound rate (Aug. 8 and Sept. 6) and once (Aug. 8) at the 3-pound rate.

In an attempt to clarify just how birds receive pesticides under our spray conditions we set aside 11 pens for different application methods. Using diazinon at a rate of 5 pounds per acre we sprayed (1) only the food supply in three pens, (2) only the birds in the three pens, (3) the pen only, omitting food, water and birds in three pens, and (4) the remaining two pens in the normal manner.

Spray Results—Phorate. Under the experimental conditions, phorate had little effect on penned pheasants. One bird died four days after the first application of phorate at the 3-pound rate. There were no other deaths and the remainder of the birds appeared normal at all times.

Treatment	Number of pens	Birds	Died	Sick	Number of applications
Phorate ½ lb	5	30	0	0	2
Phorate 3 lb	5	30	1	0	2

The pens had a heavy grass cover when the granular phorate was applied. A mowed strip 150 ft. long down the center of each pen, and relatively bare areas around the feeder, at both ends of the pen, and along the fence provided areas where the granular particles would be readily available to the birds.

Phosphamidon. Phosphamidon at a rate of ½ pound per acre had no serious effects on pheasants but when the rate was doubled to 3 pounds per acre, 90 percent of the birds were killed or become immobilized for such long periods that it is doubtful that they would have survived under natural conditions. No birds died and three became sick after the first application of phosphamidon at the ½ lb. per acre rate. A second application was made a month later and at this time only one bird became sick and none died.

The 3-pound rate had more pronounced effects on the pheasants. Nine birds died over a 10-day period and 18 of the remaining 21 birds became sick. The sick birds became immobilized, had a watery discharge from their bills, and were unable to eat. Four of the dead birds and several of the sick birds had badly scalped heads. We didn't observe how the scalping occurred, and we had never observed this on any of the sick or dead birds from other organo-phosphate insecticide trials we have completed. The sick birds would have had a difficult time surviving under natural conditions.

Treatment	Number of pens	Birds	Died	Sick	Number of applications
Phosphamidon ½ lb	5	30	0	4	2
Phosphamidon 3 lb	5	30	9	18	1

Diazinon. In our original tests with diazinon in 1966 we lost 17 of the 42 experimental birds under the 5-pound per acre treatment. This year in two pens, treated exactly as in the original experiment, we lost all 12 of the test birds. The diazinon was newly purchased, from fresh stock according to the vendor, and we have no explanation for the increased vulnerability of the birds this year. For the food treatment we spread the cracked grain on burlap sacks, sprayed it and returned it in food trays to the pens. For the "birds only" treatment, the birds were placed in small cages and submitted to direct spray for 4 to 5 seconds. For the "pen only" treatment the food, water and birds were removed from the pen before the spray application and put back into the pen immediately after the pen was sprayed.

The results of diazinon at a rate of 5 lb. per acre on pheasants under the different conditions were as follows:

Treatment	Birds exposed	Results	
		Sick	Died
Food only	18	2	15
Birds only	18	0	17
Pen only	18	0	0
Complete spray	12	0	12

The birds were affected either through the contaminated food or by direct spray, receiving the diazinon via either oral, dermal, or respiratory routes. Contact with a newly sprayed environment did not affect the birds.

The phorate and phosphamidon survivors were placed in separate pens according to original treatment and held over winter. They were returned to their original pens in April, and eggs were collected for reproduction trials.

Hatching results. There was no indication that the experimental birds differed from control birds in their reproductive success. The data from one pen of birds from the phosphamidon (½ pound rate) treatment were omitted from the analysis. The cock in this pen was apparently infertile as none of the 57 eggs collected from this pen were fertile. To check this we put a different cock in this pen and of 20 eggs collected after the change, 18 were fertile. The basic hatching data is given in Tables I and II.

An analysis of the variance of the number of chicks surviving to two weeks per egg laid, for the controls and the four treatments is shown in Table III.

Prepared by Gordon Zorb,
Approved by ——————
Date October 7, 1968.
Approved by Ralph J. ——————.

TABLE III.—2-week chicks per egg laid

Pen No.	Controls	Phorate ½ lb	Phorate 2 lb	Phosphamidon ½ lb	Phosphamidon
1	0.66	0.79	0.64	0.61	0.81
2	.80	.70	.59	.85	.69
3	.81	.68	.79	.65	.86
4	.45	.86	.64	.67	.89
5	.68	.71	.67		.53
Average	.68	.75	.67	.70	.76
Total	3.40	3.74	3.33	2.78	3.78

NOTE.—See table below:

Source	df	S.S.	M.S.
Among treatments	4	0.034	0.0085
Within treatments	19	.250	.0132
Total	23	.284	

$F = 0.644$:

$F_{(.05)}(4, 19) = 2.90$

PROTOCOL FOR FULL-SCALE FIELD TESTS TO EVALUATE PESTICIDE HAZARDS TO WILDLIFE

No single test protocol can be designed to cover all field studies because practical considerations for each field situation and compound make each study unique. It may be possible to develop similar protocols for a uniform type habitat in a given geographical region (example—study of grasshopper insecticides in short-grass plains habitat—McEwen *et al.* 1972).

The primary objective of a full-scale field study is to determine the total impact of pesticide applications on wildlife populations. Effects may occur in many ways including (1) direct poisoning and death (by ingestion, dermal exposure, or inhalation), (2) toxic effects indirectly causing death such as those increasing susceptibility to capture by a predator, (3) causing inability to reach food and water or lower resistance to weather and disease stresses, (4) loss of insect food supply and abandonment of home range, (5) harmful reproductive effects and consequent inability to maintain populations, or (6) other indirect ecological disturbances.

Full-scale field tests are applicable for proposed pesticide uses to be registered for large-scale spraying on forest, rangelands, rights-of-way, roadsides, wetlands, and major croplands (such as cotton, wheat, corn, soybeans, rice, sorghums, or alfalfa) or other major wildlife habitats. Data available from other tests such as those to determine efficacy, persistence, environmental contamination, transfer and bioaccumulation potential, and residues in livestock, may be useful in developing an estimate of total ecological effects. Such data may be nearly sufficient or may need much expansion depending on their completeness.

METHODS AND MATERIALS

A thorough pesticide-wildlife ecology study should include collection of data on wild bird and mammal populations (resident and nonresident species), climate, soil, vegetation biomass by species, numbers and biomass of arthropods (identified to lowest taxonomic identification possible), food habits of the most abundant wildlife species, and distribution and fate of pesticide residues in animals, plants, and environment. Each parameter or variable would require a separate sampling method. These data should be collected on sprayed and unsprayed areas before and after the treatment date(s).

The experimental pesticide applications should be made on the crop(s) or type of vegetation for which the pesticide will be registered. Wildland treatment areas should be a minimum of 129.5 ha (320 acres) in size for a given chemical and rate of application. Cropland or right-of-way study areas may be smaller if the typical field or area sprayed would be smaller. All treatment areas should be sufficiently large to accommodate a minimum of 2 replicates of 8.1 to 16.2 ha (20 to 40 acres) census plots with a sprayed buffer zone of at least 45.7 m (150 ft) around all plot boundaries. The experimental applications should be made at the proposed registration rate and at 2 multiples of that rate (such as 3 or 5 x and 5 or 10 x). Unsprayed cropland or wildland habitat should be studied simultaneously on replicated plots in the same manner as the sprayed areas in order to detect changes due to factors other than the pesticides.

Cropland or rangeland birds may be censused by adaptations of the *strip method* (Emlen 1971; McEwen *et al.* 1972). Emphasis should be on spring and summer resident species during the breeding season. Birds in forested or mixed habitats are usually censused by a *plot method* (Ecological Research Committee 1970).

The basic procedure in the *strip census* technique is to walk a straight line transect, usually within a given time period, and to identify, record, and plot locations of all birds seen within a predetermined width of the strip (for example, 50 m to either side of the line of travel, i.e., a width of 100 m). Strip censuses are usually run in the early morning hours to coincide with a major activity period of the birds. Transects are marked in some manner so that the same routes can be repeated periodically over several days, weeks, months, or from year to year. Frequent counts within the breeding season on replicated transects will provide statistically adequate data for comparing pre- and postspray populations and sprayed plots with unsprayed plots.

The general approach for *plot censuses* in woody or mixed habitats is similar to the strip census. The basic difference is that birds are observed, identified and plotted on a map of a rectangular or square plot (usually about 16 ha or 40 acres in size). The observer walks a more or less set route taking him to all portions of the census plot within a given time period. Other requirements such as season, time of day, replications, frequency of repetition, etc., are similar to the strip method.

With either method, weather conditions must be suitable for the counts. All nests found should be marked and checked periodically with a minimum of disturbance to determine nesting success. Reproductive success may also be estimated by recording the number of fledglings observed per unit of area and time on replicated plots.

Small mammals may be studied by a mark and recapture method using grids of Sherman-type live traps. There are various systems of trap layouts, length of trapping period, and data treatment. The system recommended by the International Biological Program (IBP), Grassland Biome (Swift and French 1972), utilized a square grid of 12 x 12 stations or 144 trap sites (15 m between stations) with 1 or 2 live traps per station. Animals captured are marked and released over a trapping period of 5 consecutive days. The same procedure is repeated in a later time period(s) (example, pre- and postspray) on marked, replicated grids. Data are analyzed by the Jolly (1965) method.

Effects of the pesticide treatments on total arthropod numbers and biomass should be measured in addition to effects on the target insect. These measurements can be made by standard entomological methods. Particular attention should be paid to arthropod species known to be important for wildlife food. The limitations of the arthropod sampling techniques used should be noted and reported.

Animal and environmental samples should be collected for pesticide residue determinations periodically until residue levels fall below 0.01 ppm. The following types of samples should be analyzed: (1) Tissues of 1 or more species of common resident omnivorous birds, (2) tissues of 1 or more species of common resident omnivorous mammals, (3) common arthropods, (4) vegetation (leaves and stems or entire above-ground parts of the wild or cultivated plants sprayed), (5) plant litter, (6) soil (to a depth of about 2½ cm), and (7) water (if any) from the sprayed area. Much of the pesticide residue data may also be required for other phases of the registration procedure and may be utilized for dual purposes.

REPORTING OF DATA

The final report should include:

An introduction and background information

Proposed use of the pesticide and related data such as vegetation or crop(s), formulation(s), and rate(s) of application.

Test methods and materials

A description of the study area including vegetation, topography and all pertinent ecological information; Study plot layout—locations and replications; Listing of resident and migrant fauna with estimates of population densities or relative abundance; Pesticide formulation(s) and application(s) including details of spraying equipment, methods, and weather conditions.

Statistical design and methods of analysis; Weather data collection; Analytical methods for residue determinations; Clinical data methods; Reproductive study methods; Carcass search methods; Other methods utilized.

Results

Mortality—number, dates, etc.; Signs of intoxication; Bird and mammal census results; Arthropod numbers and biomass; Food habits data, if any; Necropsy observations; Residue analysis results; Weather data and inclusive dates of test; Results of nest studies, fledgling observations, and other studies of effects on reproduction of resident wildlife; Integration of all data into a picture of the total ecology of the introduction of the pesticide.

Summary and Conclusions

Potential hazards to wildlife should be estimated with full consideration of possible indirect effects due to ecological disturbances.

Tables

References

References

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EXHIBIT 1

VERTEBRATES—SMALL MAMMALS

Sampling Methods—Live Trapping

Small mammal populations will be sampled by marking, releasing, and recapturing animals in grids of live traps. Where possible a grid should be established and run on each grazing treatment. The grids will consist of 12 x 12 stations, with two traps per station. Stations will be 15 m apart. Each grid will cover an area of 6.8 acres (2.7 ha). There will be at least five consecutive days of trap-mark-release on the grids. This will be followed by five consecutive days of trap-mark-release on assessment lines. This will provide basic data for estimation of population densities. Density of major species will be estimated four times during the year at the southern sites (Jornada and Pantex) and three times at the other sites.

Rodents will be marked by a system of toe amputation and/or with numbered metal ear tags. Fig. 1 shows the method to be used. Looking at the underside of the animal, the feet are read from left to right and top to bottom to give the four digits of the identification number, one digit per foot. The toes on each foot are read from left to right. If there are four toes on the foot, then there are four possible numbers that can be assigned to that particular foot: 1, 2, 3, or 4. If there are five toes on the foot, there are five possible numbers. Clipping of one toe from each foot gives a four-digit identification number. Animals with toes like the illustration will provide a possible 899 different combinations of four-digit numbers to be assigned to that species. This requires clipping of no more than one toe per foot. In the case of a natural amputation which occurs after marking, there will be two toes missing from the foot. In such cases (provided that the natural amputation cannot be distinguished from the artificial), that digit of the identification number is indicated as a 9.

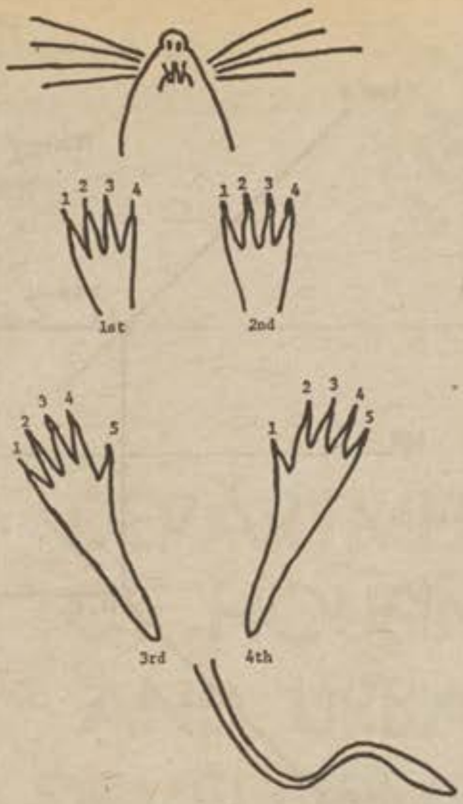

Fig. 1. Four-digit number for rodent marking.

This system often permits the original identity of the animal to be determined without confusion.

Trapping on assessment lines will permit estimation of the area sampled by the grid. Animals captured on the assessment lines are examined to see if they were marked on the grid. Unmarked animals will *not* be marked. All animals trapped will be released. Interstation interval on these lines will be 15 m with two traps per station. Eight assessment lines will be established per grid. Four of the lines will bisect the corner angles of the grid and will extend 37.5 m into the grid. The other four lines will be perpendicular bisectors of the grid sides and will extend 67.5 m into the grid. All eight lines should extend out 172.5 m from the grid. Diagonal lines will thus have 15 sets each, and perpendicular lines 17 sets each—for a total of 256 traps (two traps per set). The assessment line which bisects Row 1 of the grid will be Line 1, and the other lines will be numbered sequentially in a clockwise direction. Trap stations on each line will be numbered sequentially with the outermost trap on each line being Trap 1. Fig. 2 shows the design of the grid and assessment lines.

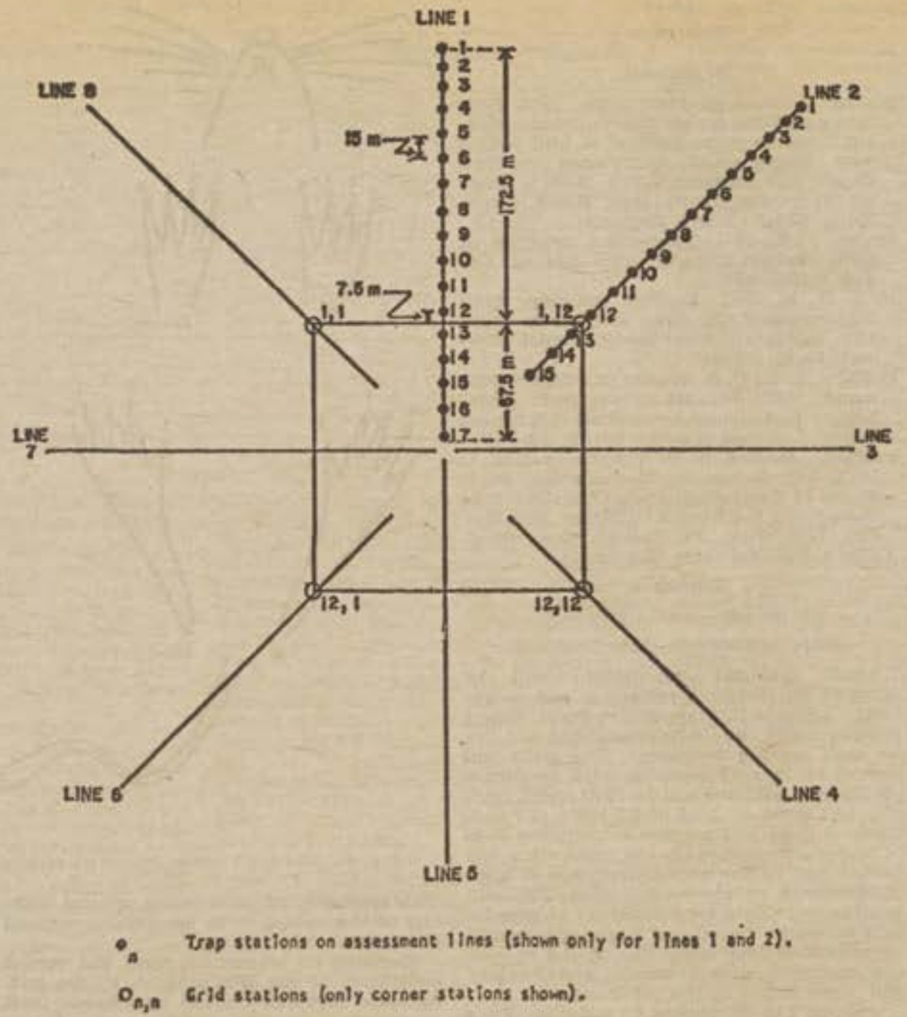
LINE 1
LINE 8
LINE 2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
15 m
172.5 m
7.5 m
1,1
1,12
67.5 m
LINE 7
LINE 3
12,1
12,12
LINE 6
LINE 4
LINE 5
$\bullet_n$ Trap stations on assessment lines (shown only for lines 1 and 2).
$\circ_{n,n}$ Grid stations (only corner stations shown).

Fig. 2. Small mammal trap grid and assessment lines (not drawn to scale).

SAMPLING METHODS—SNAP TRAPPING

Kill trapping will be conducted to obtain information on diets. In the process, some demographic data will be derived from these specimens. Animals trapped will be removed and saved for autopsy. At autopsy the animals will be weighed and measured; the testes of the males will be measured to the nearest millimeter, both length and width. For females, the condition of the mammary glands and the reproductive tracts will be recorded. *Nipples* may be small (non-lactating, nulliparous females); enlarged but not prominent (non-lactating, parous females); or enlarged and prominent (lactating, parous females). The *total number of embryos* will be recorded, including those that appear to be abnormal or resorbing. The number being *resorbed* will be recorded separately and will include only those embryos which are distinctly smaller and undergoing tissue lysis and disorganization. The *embryo length* will be recorded as the crown-rump length in millimeters of the embryo as it lies in its normal position. The total weight of the embryos and reproductive tract combined will be recorded to the nearest 0.01 g. Numbers of new and old *placental scars* will be recorded. New scars are distinguished by plentiful blood supply to the implantation site and/or a large amount of dark pigment deposited at the site. Old scars are distinguished by lack of blood supply and fainter pigmentation. The number of *corpora lutea* can be determined from the intact ovaries by examining the surface of the ovaries for firm, spheroidal, pinkish to yellowish structures.

Total stomach contents of all individuals of each major species will be preserved in Formalin and labeled. The label should contain the following information: i. site, ii. date collected, iii. collector's number, iv. code for genus and species, v. sex, and vi. age (adult or juvenile).

SAMPLING METHODS—POCKET GOPHERS

Pocket gophers will be censued by a mark-release-recapture method. Live traps will be set in exposed burrows where animal activity is evident.

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PART III

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of Assistant Secretary for Housing Production and Mortgage Credit

■

FEDERAL MOBILE HOMES

Construction and Safety Standards

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of Assistant Secretary for Housing Production and Mortgage Credit

[24 CFR Part 1400]

[Docket No. R75-340]

FEDERAL MOBILE HOMES

Construction and Safety Standards

Section 604 of the National Mobile Home Construction and Safety Standards Act of 1974 (42 U.S.C. 5403; Pub. L. 93-383) (hereinafter referred to as the Act or as Title VI) provides for the establishment of Federal mobile home construction and safety standards by the Secretary of Housing and Urban Development. In accordance with the Act, the standards are to be issued after consultation with the Consumer Product Safety Commission, the National Mobile Home Advisory Council, and State or interstate agencies deemed appropriate by the Secretary. The Federal standards must be reasonable and must meet the highest standards of protection taking into account existing State and local laws relating to mobile home safety and construction. The Secretary is also required to consider the following: Relevant, available construction and safety data; whether the standard meets the reasonable needs of the geographicl region for which it is prescribed; the effect of the standard on the cost of mobile homes to the public; and the extent to which the standard contributes to the reduction of deaths, injuries, and property losses in mobile home accidents and the improvement of the quality and durability of mobile homes.

These statutory directions and the legislative history of Title VI make clear that the Congress did not want HUD simply to adopt the existing voluntary construction standards for mobile homes. After careful review of the Act and its legislative history, HUD determined that the most appropriate course of action in implementing Title VI would be to develop a complete Federal standard covering mobile home construction and safety rather than adopt, by reference, all or part of the standards or codes for mobile homes currently in use. HUD, however, considered it useful and appropriate to utilize existing codes and standards in the development process rather than writing Federal standards without considering available sources. HUD has, therefore, very carefully reviewed existing codes and standards and has, in the proposed Federal standards, made every effort to assure reasonable continuity in the requirements for mobile home design, construction and performance while at the same time meeting the statutory mandate for upgrading, where appropriate, to provide greater quality, durability, and safety.

OTHER CODES AND STANDARDS

In researching background for the Federal standards, the following primary sources were utilized:

1. *Standard for mobile homes*, Body and Frame Design and Construction Requirements, Installation of Plumbing, Heating, and Electrical Systems, NFPA #501B (1974). The NFPA standard is sponsored by the Manufactured Housing Institute (formerly the Mobile Home Manufacturers Association), the National Fire Protection Association, and the Trailer Coach Association. The American National Standards Institute approved the 1974 NFPA 501B Standard for Mobile Homes on February 5, 1975, as ANSI A119.1. This standard will be referred to herein as NFPA 501B. State variations of NFPA 501B were also examined.

2. "Tentative Interim Amendment," Energy Task Force, Sectional Committee on Mobile Homes of the NFPA Committee on Mobile Homes and Recreational Vehicles. This will be referred to as the "Energy Task Force Amendment."

3. "Tentative Interim Amendment," Construction Task Force, Sectional Committee on Mobile Homes of the NFPA Committee on Mobile Homes and Recreational Vehicles. This will be referred to as the "Construction Task Force Amendment."

4. National Bureau of Standards, "Mobile Home Construction Standards Adopted by State Regulatory Programs—an Analysis," Washington, D.C.

5. State of California Code, Title 25, Housing and Community Development, Chapter 4, "Mobile Homes, Recreational Vehicles, and Commercial Coaches."

6. State of Washington, Department of Labor and Industries, "Rules and Regulations for Mobile Homes, Commercial Coaches, and Recreational Vehicles."

7. Canadian Standards Association Standard Z240.2—1972.

8. Miscellaneous reports of State and third-party inspection agencies on problems and interpretations of mobile home certification.

RESEARCH

The Department also analyzed existing research and contracted for several additional short-term research projects to support the formulation of the mobile home standards. This research was generally helpful to HUD in extending its knowledge of mobile home problems. In some cases, the research data led to specific new requirements in the standards. In such cases, the discussion of the detailed requirements of the proposed standard which follows later herein makes reference to the research utilized.

Among the research data and reports utilized in formulating the Federal standards were the following:

1. *Problem identification*. Performance data on 4105 mobile homes has been analyzed by the National Bureau of Standards to determine their specific performance problems. Included in the study were 3138 of the homes purchased by HUD to meet the housing needs of victims of natural disasters and 967 privately-owned homes located in various parts of the country. HUD was able to use preliminary data and analysis from this study as a guide to identify a number of areas where the present NFPA 501B standard is inadequate.

The objectives of the project were to: (a) Identify significant performance failures or problems in the structural, plumbing, electrical, and heating systems of mobile homes; (b) determine the relationship of these problems to the adequacy of NFPA 501B "Standard for Mobile Homes;" (c) determine if the problems identified relate to the failure of the methods of enforcement of the standard; and (d) determine the durability of mobile homes for purposes of assessing mortgage insurance needs and limitations.

The NBS audited thousands of maintenance, certification (inspection), and consumer records using computer techniques. The nature and frequency of technical problems and failures were compiled, correlating the specific problem area with the applicable section of NFPA 501B. Of the HUD disaster mobile homes, 257 were dismantled to determine their condition in detail, and to assess the weak points in design and construction.

The final report will include a computer analysis and a narrative evaluation in which the causes and possible remedies of the more severe and chronic problems are discussed. This report will be delivered to HUD by August 1975.

2. *Mobile home fire safety*. The objectives of this project were to obtain experimental research data on the potential growth and spread of fires in mobile homes. Full scale tests have been and will continue to be conducted by the National Bureau of Standards to determine the factors influencing fire spread and severity. In the tests conducted to date, interior surface finishes on walls and ceilings were the primary variables. The NBS compared typical existing interior finish materials and other types and combinations of materials that might reduce fire spread and damage and improve the conditions for occupant escape. Baselines of performance are being developed from which improved fire control and decreased risk of injury may be measured against probable increased costs.

The NBS has conducted more than 40 fire tests on the kitchen range top and in the hallways of a typical 12 x 60 foot single-wide mobile home to simulate realistic mobile home fire conditions. The tests on kitchen range fires, sponsored by the Mobile Home Manufacturers Association began in mid-1974 and have been completed. The tests were designed to determine the effect of using different materials behind and above the range in the presence of a range top cooking oil fire. Plywood with a flame spread rating of 200 ($\frac{9}{32}$'' thick) and gypsum wallboard with a flame spread rating of approximately 25 were tested behind the range. Plastic and wooden doors were tested in the cabinets above the range. In some tests, the cabinets were protected by a metal hood having a lip extending several inches beyond the cabinet front plus a sheet of $\frac{1}{4}$'' asbestos millboard.

The NBS also conducted mobile home corridor (hallway) tests in technical consultation with HUD during the period from March 15 through May 1, 1975. These full-scale tests investigated the effect of using finishes with flame spread ratings ranging from 25 to 200 in various combinations in the corridor walls and ceilings. These tests have provided data on the performance of a wide range of available materials used in mobile homes. They provided a base-line of performance against which other materials and situations can be evaluated in future tests.

3. *Smoke detector standards.* Following Hurricane Agnes, HUD provided more than 16,000 mobile homes as temporary housing for flood victims. To improve the fire safety of these mobile homes, smoke detectors were installed in all of these homes. To HUD's knowledge, no unsatisfactory performances of these smoke detectors were noted or reported.

Since 1973, the National Bureau of Standards has been studying various types of smoke detectors and their performance in various locations in mobile homes. Their findings have been instrumental in selecting the types of detectors required in these standards and their appropriate location within mobile homes.

4. *Mobile home highway transportation performance.* A special study was jointly undertaken by HUD and the Department of Transportation (Federal Highway Administration) in 1973–74 to analyze the performance of typical mobile homes and modular buildings while being towed on the nation's highways. Over 12,000 miles of such movements were recorded. The objective was to obtain engineering, economic, and motorist-behavior data in order to reach rational decisions regarding state regulations so that such wide-load movements can be made as safe as possible without undue economic burden to the purchasers of such homes, to the states, or to other highway users. As a secondary benefit, considerable data and information was obtained on the effects of transportation on housing durability and quality. The results, prepared by the Midwest Research Institute in their study, "Economic Evaluation of Mobile and Modular Housing Shipments by Highway" (two volumes) have been presented to the American Association of State Highway and Transportation Officials for policy review and comment.

5. *Other Investigations.* In addition to the above research, the Department has been in consultation with the Consumer Product Safety Commission and has reviewed the Commission's work on flame-fired appliances, on tub and shower hazards, on aluminum wiring, and on accidents in and around mobile homes as recorded in their National Electronic Injury Surveillance System.

OTHER SOURCES

Although HUD utilized a variety of sources in arriving at the proposed Federal standard, significant portions of the standard have come from the "Standard for Mobile Homes," NFPA 501B. Editorial and other changes were made to the material taken from NFPA 501B. Also, the organization was changed for the sake of clarity, ease of use, and consistency with Federal regulations.

The Department recognizes that the NFPA Sectional Committee on Mobile Homes (which developed NFPA 501B) represents significant interests and expertise in the field. HUD expects that the NFPA Sectional Committee on Mobile Homes will continue to be an important source of ideas, information, and recommendations for mobile home standards. The Department looks to the ANSI/NFPA Sectional Committee as well as other organizations for continuing assistance in refinement of the standards. This is in keeping with the Secretary's responsibility under the Act to consider the research, development, testing, and evaluation activities conducted by private organizations in establishing mobile home standards to protect the public.

The Federal standards proposed herein are an amended version of the initial draft standards that the Department distributed to members of the National Mobile Home Advisory Council (hereinafter, the Council) in accord with HUD's responsibility under section 605(b) of the Act. The proposed standards differ from the earlier version in part because of comments and suggestions made by Council members and members of the public attending the May 5–6, 1975, Council meeting. Additionally, to the extent possible, written comments received as a result of the May 5–6 meeting have been reviewed and incorporated where appropriate.

All written comments received as a result of the first Council meeting will be reconsidered when reviewing comments submitted in response to this notice of proposed rulemaking.

THE PROPOSED STANDARD

The following is a detailed description of the proposed Federal Mobile Home Construction and Safety Standards. This discussion follows the organization of the proposed Federal standards using section references from the proposed Standard. Where appropriate, because NFPA 501B is the standard most commonly in use, reference is made to differences between the proposed standard and NFPA 501B. In making comparisons between the proposed standard and NFPA 501B, the differences in the organization of the document should be noted as well as the inclusion of certain requirements that had been advisory recommendations in NFPA 501B.

There are seven subparts within the standard: (A) General; (B) Planning Considerations; (C) Fire Safety; (D) Body and Frame Construction Requirements; (E) Plumbing Systems; (F) Heating, Cooling, and Fuel-Burning Systems; (G) Electrical Systems; and (H) Transportation.

A. *General.* This subpart gives the scope of the standards; the definitions applicable to all parts of the standards; and miscellaneous information about plan submission, materials incorporated by reference, and required data plates.

The definitions are taken from the Act to the extent that terms are defined there, from definitions in NFPA 501B, and from other sources.

B. *Planning considerations.* This subpart describes the requirements for floor area, closets, ceiling heights, and door and window dimensions. The requirements of this standard differ from NFPA in only a few ways. First, a specific minimum door height of 74 inches (6 feet, 2 inches), has been established. This should minimize possible head injuries to users of mobile homes. Second, minimum total glazed areas of exterior doors and windows has been reduced to 8 percent of the gross floor area (from 10 percent in the NFPA 501B standard) and the minimum area available for unobstructed ventilation is now 4 percent of the gross floor area (from 5 percent). These changes were made because of energy conservation considerations, recognizing that a reasonable compromise must be struck between energy conservation requirements and the need for natural lighting and ventilation.

C. *Fire safety.* Generally, the standard regulates fire safety in several important respects. The surface flammability of interior material is limited in most parts of the home—more severely in those locations where heat and flame increase the likelihood of inadvertent ignition. Fire stopping is specifically required within wall and ceiling cavities. Improved egress windows or doors must also be provided in any room to be used for sleeping. The improvements in the egress windows and doors will allow easier operation in case of emergency, thus enhancing escape possibilities. Finally, improved smoke detecting alarm systems must also be provided for each hallway or space leading to sleeping quarters.

The term "flame spread" is central to the issue of fire safety and is used in Subpart C of this standard as well as in the discussion that follows. Flame spread is a measure of the speed at which a fire will propagate across a surface under specially controlled test conditions. It is rated on a scale for which the flame spread index of red oak is 100 and the flame spread index of cement asbestos board is 0. Materials are also referred to as Class A (flame spread index of 25 or less), Class B (flame spread index of 26 to 75), and Class C (flame spread index of 76 to 200).

a. *Smoke detectors.* The requirements for smoke detectors are more stringent than had been the case under the NFPA 501B standard. The National Bureau of Standards, under contract to HUD and the Consumer Product Safety Commission, has carried out research projects on the efficiency of various types of smoke detectors and on the effect of smoke detector location on the time to alarm. The results of these tests showed that ceiling and exterior wall locations for smoke detectors were undesirable because of boundary layer effects in the air at these locations that slowed smoke penetration into the detector. In regard to the smoke detectors themselves, the gas sensor type detector was found to be either too sensitive to various gases or insufficiently sensitive to smoke depending on its adjustment.

As a result, only the ionization chamber or the photoelectric type of detector is permitted by the proposed standard. Because of the unreliability of batteries over a period of years, and because homeowners are, in a significant number of cases, insensitive to the need for maintenance on passive, battery-powered devices, only smoke detectors that operate from 120 volt alternating current mobile home electric power are permitted by the standard. Except for circuit breakers, there may be no switches in the circuit supplying current to the smoke detector.

b. *Carpeting.* Carpeting installed in mobile homes must meet the Department of Commerce Standard DOC FF 1 test. This test for carpeting involves the use of a burning "pill" to determine if a fire started in this manner will extinguish itself. This provision makes explicit in the Federal mobile home standards the applicability of the Consumer Product Safety Commission regulation on carpet flammability.

c. *Furnace and water heater compartments.* Recent data from the NFPA indicates that 20.6 percent of all reported mobile home fires originate from ignition sources in the furnace and water heating compartments. The NFPA has estimated the ignition sources in furnace spaces are the cause of 14.1 percent of all mobile home fires, and in hot water heater compartments, 6.5 percent of all mobile home fires. It is desirable, therefore, to insure that the interiors of these compartments are lined with materials possessing a low flame spread. Walls and ceilings of water heater and furnace compartments will therefore be required to have a flame spread rating no greater than 25 (Class A materials). This requirement was recommended in the Construction Task Force Amendments.

d. *Kitchen.* Recent data collected by the National Fire Protection Association indicates that approximately 28 percent of all reported mobile home fires originate in the kitchen, with 17.2 percent of that number occurring in the kitchen range area. The measures required in the standard will better contain cooking range fires, and will reduce the loss of life and injuries resulting from such fires when they do occur.

Three new requirements are being imposed in this subpart. First, the wall behind and immediately adjacent to the kitchen range, or top, must have a flame spread of less than 25. Second, the doors, exposed bottoms, sides, and countertops of all cabinets must have a flame spread no greater than 200. Third, the bottom of combustible kitchen cabinets over the range must be protected by a piece of 1/4 inch thick asbestos millboard and by a metal hood at least as wide as the cooking range or top which must have an eyebrow extending 3 inches beyond the cabinet fronts.

Tests carried out by the National Bureau of Standards (NBS) have shown that the protection given by these changes is quite significant. For example, using a heated cooking oil fire on top of a stove as an ignition source, it was found that without the protection of a metal hood, asbestos layer, and low flame spread material on the walls around the range, that the wall behind the range and cabinets could be ignited in 30 seconds, with the fire burning through the 5/32 inch plywood behind the range in several minutes. With these protections, there was no burn-through of walls behind the stove, and the kitchen cabinets did not ignite for approximately four minutes after the fire was started. The increased time provided by these improvements should be significant in allowing extinguishment if possible, or in allowing time for all inside the home to escape.

e. *Other areas of fire protection.* The Department has considered several additional proposals for areas to be protected including reducing the required flame spread rating in various other parts of the mobile home. There are precedents for reduced flame spread requirements. For example, the Canadian code for conventional and mobile homes requires that the flame spread of interior materials not exceed 150. Also, the State of New York has adopted, but not put into effect, a requirement that interior materials in mobile homes be limited to Class B or better.

There are other reasons why the Department considered modifying the flame spread requirements. HUD has received a petition to require Class B materials in the Federal mobile home standards. At least one major manufacturer is currently using Class A materials (gypsum wallboard) throughout the interior of the homes it manufactures without apparent competitive or cost disadvantages. The National Bureau of Standards' corridor and kitchen range fire tests demonstrated the considerable additional fire protection provided by Class A materials. (It should be noted, however, that even the use of Class A finishes in the interior of a mobile home does not eliminate the hazards of fire from furniture and other items within the home, either from heat and flame or from hazardous combustion products, such as carbon monoxide, smoke, and toxic gases.)

In the draft Federal mobile home standards presented to the Council on May 5-6, 1975, the Department proposed (in addition to the above fire safety improvements) that the corridor areas of mobile homes be required to have walls and ceilings surfaced with Class A materials. The basis for this proposal was the assumption that access to the corridor during a fire would aid in the rescue of children and invalids located in bedrooms. The NBS corridor tests showed that the time during which rescue through the corridor would be possible was significantly extended by the use of these materials.

The Council considered the proposal and raised a number of objections. These included cost and manufacturing problems in handling and installing gypsum wallboard, the material most likely to be used to achieve the low flame spread rating. It was also claimed by some members of the Council that a loss of wall shear strength in the corridor area plus the added weight of the wallboard would reduce the resistance of the home to transportation damage; specifically, cracking as a result of induced highway shock and vibration. The Department is currently conducting a limited test program to attempt to obtain more information related to this potential problem.

As a result of these considerations, the Council voted to recommend to the Secretary that the requirement for low flame spread materials in the corridor area be deleted until: (1) Further research could better document the need for such materials, (2) the manufacturing and transportation difficulties could be determined and assessed, and (3) the cost of meeting this requirement can be determined with greater certainty.

The Department agrees with the Council that sufficient supporting research has not yet been completed to conclusively justify the requirement of a maximum flame spread of 25 in corridor area walls and ceilings. Therefore, the proposed standards require a 200 flame spread rating for mobile home interiors except as noted above. However, HUD is considering the possibility of adoption of one of several other alternative requirements in the initial Federal Mobile Home Construction and Safety Standards, or at some later time, as future research provides additional information.

The following are five alternatives to the proposed standard that are presently under consideration:

ALTERNATIVE I

Section 1422.030(a)(1). All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms including foyer, bathrooms and utility rooms shall not exceed 200 flame spread rating except the walls of hallways shall not exceed 25 flame spread rating. (2) All ceiling surfaces shall not exceed 200 flame spread rating except the ceiling of hallways shall not exceed 25 flame spread rating.

ALTERNATIVE II

Section 1422.030(a)(1). All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms including foyer, bathrooms and utility rooms shall not exceed 150 flame spread rating and the minimum time for burn-through under ASTM #E119 shall be five minutes. (2) All ceiling surfaces shall not exceed 75 flame spread rating.

ALTERNATIVE III

Section 1422.030(a)(1). All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms including foyer, bathrooms and utility rooms shall not exceed 200 flame spread rating. (2) All ceiling surfaces shall not exceed 25 flame spread rating.

ALTERNATIVE IV

Section 1422.030(a)(1). All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms including foyer, bathrooms and utility rooms shall not exceed 25 flame spread rating. (2) All ceiling surfaces shall not exceed 25 flame spread rating.

ALTERNATIVE V

Section 1422.030(a)(1). All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms including foyer, bathrooms and utility rooms shall not exceed 200 flame spread rating. (2) All ceiling surfaces shall not exceed 200 flame spread rating.

Section 1422.080. Mobile Home Fire Extinguishing Equipment (a) All mobile homes shall be equipped with sprinkler protection in each of the habitable rooms, not including bath, closets, according to NFPA 13D level (e).

The Department is particularly interested in comments on the above alternative proposals that address the following questions:

1. The extent to which each proposal would be likely to contribute to the safety of mobile home occupants in the event of a fire.
2. The extent to which property losses in mobile homes resulting from fires would be reduced under each of the proposals.
3. The reduction in insurance premiums that might be expected as a result of each of the requirements.
4. The cost of manufacturing under each of the alternatives, as well as the likely cost to the consumer.
5. Federal, state, or local regulations pertaining to safety and health with which the manufacturer would have to comply as a result of any of these proposals.
6. The availability of supplies or materials that would be needed to meet each of these requirements both in the short and the longer term.
7. The effect of any of these requirements on the durability and transportability of mobile homes.
8. The availability of skilled workers needed to manufacture mobile homes.
9. The effect on esthetic considerations (consumer acceptance).
10. The effect on energy conservation both in manufacturing process and in the occupant-use of mobile home.

D. *Body and frame construction requirements.* This subpart describes the requirements for the chassis, framing, structural strength and rigidity, surface materials, roofing, window and door performance, weather resistance, insulation, and ventilation.

The major requirements of this proposed subpart that differ most significantly from NPFA 501B are the wind and snow load requirements, the insulation standard, and the weather protection requirements.

a. *Wind and snow loads.* Wind and snow load requirements (§ 1423.050(c)) have been upgraded to reflect new data that is available on climatic conditions in the Nation. Present State requirements and anticipated enforcement problems relating to the movement of mobile homes between zones having different requirements were also considered.

A map of snow loadings has been developed which delineates three zones. The snow zone boundaries generally follow State lines. Future HUD rules and regulations will make clear that a State will be able to set more stringent snow loading requirements for a local area within its jurisdiction if weather data supports such requirements. However, HUD will require a State which proposes to establish more stringent requirements to submit its proposal (with supporting data) to HUD for review and filing.

In the draft standards, presented to the Council, two wind zones were proposed. These zones were based on ANSI A58.1 (1972). Higher wind areas through the central part of the Nation are being recognized as regions needing additional protection against windstorm. In the original draft, requirements for this region were made the same as for the Gulf Coast and Eastern Seaboard hurricane areas.

After a considerable discussion of this proposal, the Council was unable to reach a concensus on this question. Some members recommended a single standard for the whole Nation to insure protection without impairing mobility or causing enforcement problems. Others argued that the standards were set too high for certain regions of the Nation and that extra costs would be unnecessarily incurred by the proposal.

HUD carefully considered all arguments and has tentatively concluded that it would be most cost-effective and responsive to regional weather conditions to establish three wind loading zones on a map of the United States. The three zones are: (1) The hurricane zone—roughly 100 miles inland from the Gulf and Atlantic coasts (in which a mobile home is required to withstand a horizontal wind load of 25 pounds per square foot, psf, and an uplift load of 15 psf); (2) the mid-continent zone—the Plains states, northern Rocky Mountains, and across to the northern Pacific coast (20 psf horizontal and 12 psf uplift to withstand wind loadings of up to 80 mph); and (3) the remaining area (15 psf horizontal and 9 psf uplift). Because of the concerns raised by the Advisory Council, however, the following alternative wind load requirements to § 1423.050(c) are still being considered:

ALTERNATIVE I

Section 1423.050(c). The mobile home and each wind resistant part and portion thereof shall be designed for a total horizontal wind load of 25 psf (pounds per square foot) and a total vertical uplift load of 15 psf.

ALTERNATIVE II

Section 1423.050(c)(1). Standard Wind (Zone I) when a mobile home is not designated as "Windstorm Resistive," the mobile home and each wind-resisting part and portion thereof shall be designed for a total horizontal wind load of 15 psf and a total vertical unlift load of 9 psf.

(2) Windstorm Resistive (Zone II) When a mobile home is designated as "Windstorm Resistive," the mobile home and each wind resisting part and portion shall be designed for a total horizontal wind load of 25 psf and a total vertical uplift load of 15 psf.

NOTE.—The areas designated in the proposed standard as Zones II and III would comprise Zone II for the purpose of this option.

The Department particularly invites comments on these alternatives addressing the following questions:

1. To what extent would each of the proposals contribute to the safety or durability of mobile homes subjected to wind loadings that would be expected to occur in various regions?
2. What reduction in insurance premiums would be likely to result from any of these alternatives?
3. What would the cost to the consumer be for each of these proposals as a function of the zone in which the home would be located?
4. What difficulties in enforcement would be presented by each of these proposals?
5. Are there any other considerations that should be made in analyzing these alternatives?

b. *Thermal protection.* Section 1423.090, *Thermal protection* is a completely new section. It was basically developed by the Energy Task Force of the NFPA Sectional Committee on Mobile Homes as a Tentative Interim Amendment to NFPA 501B. Insulation, air infiltration, ducting, ventilation, and certification information are covered in this section. Three zones have been established for the purpose of determining winter design temperatures. Delineation of these zones again follows State boundaries (approximately the 37th parallel between zones 1 and 2 but with California in the southern zone and Nevada in the northern zone, Hawaii in zone 1, and Alaska alone in zone 3).

The Department has calculated that the changes in the insulation requirements will result in savings for heating alone, ranging from $11 and $79 annually depending upon the location of the home and the type of heating used. The average saving throughout the country is estimated to be $40 per mobile home each year at current fuel and electricity costs.

For both the thermal protection requirements and the snow and wind loading requirements, dealers will be held responsible for selling only units certified for the zone in which they will be sited. Further regulations on enforcement of these provisions will be issued in the future.

c. *Weather resistance.* New requirements have been added at § 1423.090 to improve weather resistance. These are based on the NBS problem study referred to earlier. To ensure that joints between exterior coverings and frames of openings are protected, an approved sealant must be used. In cases where joints are such that separation can occur as a result of stresses imposed by erection, transportation, or other loads sealants must be used that can withstand such stresses while maintaining protection against air and moisture infiltration, and vermin penetration.

d. *Window and door standards.* The standards for ordinary windows, egress windows, and exterior doors in mobile homes are incorporated into the text (§ 1423.103–5) of the Standard. These standards were developed by the Mobile Home Manufacturers Association. They set requirements for glazing (strength and safety) materials, hardware, structure, air and water infiltration, operation, shipping, identification, and operation. Test methods are also specified. It was recognized that, at the current state of the art, compromises had to be made between weather tightness and energy conversation, on the one hand, and ease of operation on the other.

e. *Structural test procedures.* Two test procedures have been adopted from the California standard, one for ultimate load tests of structural assemblies (§ 1423.101(b)) and the other for nondestructive testing of roof trusses (§ 1423.101(c)).

f. *Other requirements.* The following are additional new significant requirements that have been incorporated in this subpart:

1. Reference standards for material, systems, and practices that are recommended in NFPA 501B which are now mandatory. (§ 1430.040).

2. A reference standard for gypsum wallboard has been included (§ 1423.040).

3. The maximum moisture content of dimension and board lumber has been limited, at the time of installation, to 19 percent (§ 1423.040).

4. A requirement has been added that in designing a mobile home the adverse effect on the durability of a mobile home during its normal lifetime resulting from transportation shock and vibration must be considered (§§ 1423.030(c) and 1423.050(a)).

5. Design load deflection requirements for walls and partitions have been added (§ 1423.050(d)).

6. The California puncture resistance test for mobile home bottom boards has been incorporated (§ 1423.050(g)).

7. Miscellaneous requirements on roofing membranes and framing members have been included to ensure that the strength and rigidity of the roof is maintained (§ 1423.050(h)). For example, wood backing of metal roof membranes has been required where they are penetrated by pipes or vents. These requirements were added as a result of durability data from the NBS problem study that indicated deficiencies in roof strength, water ponding, and leakage.

E. *Plumbing systems.* This subpart describes the proposed requirements for the water supply and drainage systems, including the fixtures that are connected to the water supply and drains. The following new requirements have been incorporated into this subpart:

1. A plumbing system must allow complete drainage to eliminate the possibility of freezeup during transportation. (§ 1424.030(b)(4))

2. Piping and electrical wiring cannot pass through the same holes in walls, floors, or roofs, and plastic piping cannot be exposed to heat or radiation from open flame appliances. (§ 1424.030(b)(6))

3. Reference Standards for material, systems, and practices that were recommended in NFPA 501B have been made mandatory. (§ 1424.040)

4. Plumbing fixtures must be labeled and spaced to allow intended use and replacement, and bathtub rims must be supported. (§ 1424.070)

5. A master cold water shut-off valve must be placed on the main feeder line in an accessible location. (§ 1424.080(b)(1))

6. As a result of problems brought to the Department's attention by enforcement agencies and by the National Bureau of Standards report, this subpart will explicitly require that pressure relief valve drains be so placed as to assure that they will not freeze or become otherwise blocked and will also require that water released by the operation of the valve will be directed outside the mobile home. (§ 1424.099(c)(1))

7. A sentence requiring consideration of corrosion protection at junctions of dissimilar metals is incorporated in § 1424.090(d)(2).

8. In § 1424.100, drainage systems are specifically required to have water-seal traps at each fixture connection. Also, adequate venting is required to prevent siphonage, aspiration, or forcing of trap seals under ordinary use.

9. The location of the drain outlet must be labeled under § 1424.100(c)(1).

10. Plumbing and roof space ventilation on caps that are identical must be identified with permanent markings under § 1424.110(g).

11. Section 1424.110(d)(1) bars the use of anti-siphon vent devices. HUD's initial draft which was presented to the Council permitted these devices. HUD, after reexamining the question, taking into account the comments of Council members, concluded that until a manufacturing standard for such devices has been developed it would be inappropriate to permit such devices in mobile homes (National Sanitation Foundation Standard NSF–24–1972 covers the use not the manufacture of anti-siphon trap vent devices).

F. *Heating, cooling and fuel burning systems.* This subpart describes the requirements for space and water heating systems, air cooling and conditioning systems, appliances that burn gas or oil or which produce heat (such as clothes dryers), and the various ducts, vents, gas and oil piping and other equipment that is required for proper operation of these systems. Several important requirements have been taken from the Energy Task Force Amendments. New definitions of air conditioning systems come from these Amendments along with the definition of an external combination heating/cooling system. All or part of the sections on "Heat Producing Appliances" (§ 1425.061), on "Electrical Clothes Dryers" (§ 1425.062(b)), on "Installation of Forced Air Appliances" (§ 1425.063(e)(6) and (7)), "Instructions" (§ 1425.065), "Appliances, Cooling" (§ 1425.068) and "Circulating Air System" (§ 1425.069) come from the Energy Task Force Amendments. New requirements for circulating air systems include sizing of ducts for heating and cooling, insulation of ducts, use of only listed ducts, and resistance of ducting to deterioration from ultraviolet rays, cold weather, moisture, and rodents. In addition to the above, the following new requirements (or clarification of NFPA 501B requirements) are included in this subpart:

1. Reference standards for material, systems, and practices that are recommended in NFPA 501B have been made mandatory. (§ 1425.030)

2. A shutoff valve is required immediately upstream of quick-disconnect devices for appliance connections. (§ 1425.051(1))

3. Because of the problem of false readings, automatic controls for interior temperatures cannot be located on exterior walls, the common walls of appliance compartment, or within 3 feet of the vertical edge of an appliance compartment door. (§ 1425.061(g))

4. Vertical clearance above a cooking range must be a minimum of 24 inches (§ 1425.063(f)). (Note that there are additional fire safety requirements in (§ 1422.040.)

5. Section 1425.064(e) requires that vent ducts terminate and discharge outside the mobile home.

G. *Electrical systems.* This subpart provides the requirements for the electrical supply, outlets, connections, and appliances. It includes requirements for adequate availability of electrical outlets, protection against electric shock, installation of electrical wiring and related equipment, and the method by which a mobile home is connected to a source of electric power.

At the recommendation of the Council, the proposed Standard requires, in the case of homes with electrical needs in excess of 50 amps, that by means of a mast weatherhead installation as specified in Article 230 of the National Electrical Code. Multiple power supply cords will not be allowed. A single, 50 amp cord will be allowed if it is adequate to serve the unit.

Several parts of the California mobile home code were adopted, including requirements for electrical supply cord protection at the point of entry as well as within the mobile home; for protection of the supply cord plug-cap while the unit is in transit; and for receptacle outlet locations (§§ 1426.030 (j) and (k) and 1426.060(d) (5) through (8)).

Other requirements include: the specification of ground fault circuit protection for bathroom and outdoor circuits (§ 1426.060(b)), a minimum distance specification of 30 inches from a receptacle outlet to a shower or bathtub space to protect against electrical shock of a person bathing (§ 1426.060(e)), and the listing as appropriate for use in damp or wet locations of lighting fixtures to be used in bathing areas (§ 1426.070(c)).

Explicit language of the National Electrical Code has been included in the standards for the securing of non-metallic sheathed cable (§ 1426.080(d)). Similarly, language from the code has been included for the support of electrical boxes (§ 1426.080(n)). This is a result of the high failure of such mountings found by the National Bureau of Standards in its mobile home problem-identification study.

H. *Transportation*. This subpart imposes a requirement that the mobile home shall be designed, in terms of its structural, plumbing, mechanical, and electrical systems to fully withstand transportation forces during its intended life. (NFPA 501B contains no requirements for transportation. Recommendations covering transportation are contained in an appendix to that standard.) It also defines the performance requirements of the "transportation system" (i.e., frame, running gear, drawbar and coupling mechanism, and lights).

Tires for mobile homes will be required to meet the new tire standard for trucks, buses, and trailers of the National Highway Traffic Safety Administration, Motor Vehicle Safety Standard 120 (49 CFR 571.120).

The proposed subpart is based upon research conducted by the Department with the transportation of large numbers of mobile homes and modular buildings; and with research, conducted by NBS at the request of HUD.

FURTHER RESEARCH

The Department regards the Federal Mobile Home Construction and Safety Standards as being evolutionary. The Standards will continue to be amended in the future as justified by public policy considerations and research data. A number of research projects are contemplated that will help to determine the direction of future amendments to the standard. Included among these are:

1. *Further full scale fire testing*. During the period from May through August 1975 and beyond, full scale fire testing will be expanded to determine fire growth patterns as a function of the location of the origin of the fire, e.g., in the living room, dining area, and bedrooms. As with the earlier tests, these experiments will yield technical information on the spread of the fire, temperature, radiation, smoke and combustion products and potential escape time as a function of the type of wall and ceiling materials used in the home. These and other factors will be fully recorded during each test through still and motion picture photography.

Problems resulting from the use of heavier materials for walls and ceilings in mobile homes (such as gypsum wallboard) in order to achieve better fire resistance are, also, to be examined. The focus of this work will center on potential mobile home production and transportation problems which might result from the use of such material.

2. *Evaluation of fire loads in residences and mobile homes*. HUD has contracted with the NBS to survey approximately 150 occupied mobile homes to determine their potential fire loading. The survey will evaluate the relationship of various types of furniture, drapes, clothing, and appurtenances in combination with the mobile home structure that would contribute to the residence's total fire load. An analysis of fire growth as a function of room geometry, ventilation, and other factors will also be carried out.

The study will consider the condition and contents of typical mobile homes as they are in use to provide further insight into the fire data generated.

3. *Smoke and flame spread study*. A study has been designed to look principally at the contribution of typical interior finish materials to the spread of fire and smoke from an incidental fire in a room of a conventional house. A variety of materials including gypsum wallboard, plywood, and particle board will be tested. Mathematical models will be used to gain a better understanding of fire growth in a typical room. The final product will be a set of recommendations relating to the use of materials for ceilings, walls, and floors as a function of their flame spread ratings and smoke generation levels.

Although this specific task is being carried out in terms of data related to conventional housing, the study will produce information that will be applicable to improvement of mobile home fire safety.

4. *Computer analysis of energy consumption*. The Oak Ridge National Laboratory in Tennessee has been investigating the energy consumption characteristics of a typical mobile home. They are developing analytical tools for predicting mobile home thermal performance in different climatic regions. Experimental data have been collected, and the results are being used to confirm and modify a computer program used for modeling. It is hoped that the program will help identify where improvements in mobile home construction and design (or where retrofitting may be accomplished) to cope efficiently with various climatic regions. This work is being independently performed by the Energy Research and Development Administration (ERDA).

5. *Solar heated mobile home*. A second ERDA project is being carried out at the Los Alamos Scientific Laboratory in New Mexico. An experimental solar heated mobile home is undergoing conceptual development, design, and engineering. While principally intended for the U.S. Southwest, the designs will also allow adaptation of the prototype system to other regions and climates. The end product will be technical data and reports to be published in 1976.

6. *Wind and anchoring research*. This research will analyze the adverse effects of high winds on relatively light weight structure and the effectiveness of various types of mobile home tie down and anchoring devices. Wind-upset and lateral movement of mobile homes will be tested under various strap, anchoring, and soil conditions.

7. *Structural durability*. Environmental tests will be conducted relating to the long-term performance of mobile home structural systems (such as the walls, roofs, and floor) in order to assess their longevity under realistic normal usage.

8. *Component performance*. Several aspects of the electrical, plumbing, heating, and cooling systems of mobile homes will be tested to evaluate their long-term, "in-use" capabilities.

9. *Transportation*. Tests and demonstrations will be carried out on various types of mobile homes to determine the cumulative effect of highway shock and vibration on incremental degradation of roofs, walls, and windows.

CERTIFICATION

Manufacturers will be required to certify that their mobile homes comply with all applicable mobile home standards. In addition, State or third-party inspectors will closely monitor production to ensure that manufacturers are abiding by their quality control programs so that defective mobile homes are not being shipped. HUD will, in turn, regularly audit the performance of the State enforcement agencies and third parties.

Pre-production design evaluations will also be required to give reasonable assurance that a mobile home design complies with the applicable standards. This may be carried out by either State or third-party engineers.

INSTALLATION ON SITE

The susceptability of mobile homes to wind damage when not anchored is well known. Over 5,000 mobile homes are damaged annually by severe winds. Many of these homes are not effectively tied down. HUD's experience with the flood insurance program has also shown that inadequate support and anchoring of mobile homes can result in unnecessary damage under flood conditions. Even under normal conditions, improper or inadequate installation of a mobile home can lead to service problems or premature deterioration as serious as that which results from improper manufacturing.

Some manufacturers are currently preparing extensive instructions on the methods by which their mobile homes are to be installed, including tie-down instructions. It will be a requirement of the HUD enforcement program that all manufacturers include detailed instructions for installation as a part of their mobile home design plans and specifications at the time that these plans are submitted to the enforcement agency.

At the present time, no specific proposals are being tendered for mobile home installation standards. However, manufacturing plans will be reviewed for the soundness and adequacy of the engineering practices employed, the clarity and completeness of the instructions, and their applicability to the conditions of the area in which the mobile home is expected to be sited.

On the basis of known data on mobile home installation and its effect on the safety, quality, and durability of mobile homes; the Department will be conducting further technical research relating to mobile home installation, and will also review the Act to determine if authority exists for HUD to promulgate installation standards. Departmental policies on mobile home installation will be determined in the near future so that the necessary regulations or further legislation can be drafted or proposed.

MISCELLANEOUS

All material referred to in this preamble or referenced in the following standards is available for viewing and copying in room 6262, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, D.C. Copies of any part of the material may be obtained at cost in accordance with the rules and regulations of the Department (24 CFR 15.14).

A draft Environmental Impact Statement for the proposed Federal Mobile Home Construction and Safety Standards has been prepared and submitted to the Council on Environmental Quality. It is available for inspection and copying according to Department rules and regulations during regular business hours in room 6262, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, D.C.

An Economic Impact Statement assessing the impact of the Federal Mobile Home Construction and Safety Standards as proposed herein on the economy, the labor force, competition, and material and energy supplies has been prepared and submitted to the Council on Wage and Price Stability. This Statement is available for inspection and copying according to the rules and regulations of the Department during regular business hours in room 6262, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, D.C.

In consideration of the foregoing, it is proposed that the initial Federal Mobile Home Construction and Safety Standards be adopted as Parts 1420-27 of 24 CFR Ch. 14, as follows. The proposed effective date of these standards is 180 days after promulgation of final regulations, which in accord with 42 U.S.C. 5403(g), (section 604(g) of the Act) shall be no later than August 22, 1975.

Comments on this proposal are solicited and will be considered if received on or before July 27, 1975. It is requested copies of any written comments be sent to:

Rules Docket Clerk
Department of Housing and Urban Development
Room 10245
451 Seventh Street SW.
Washington, D.C. 20410
Docket R75-340

Comments received after that date shall be considered only as time permits, or shall be considered as petitions for further rulemaking.

All written comments shall be available for examination by the public in room 10245, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, D.C., except those determined to be exempt from public disclosure in accordance with the requirements of 42 U.S.C. 5406(b) (Section 607 (b) of the Act) by the Secretary, at the written request of the person submitting the comment.

New Part 1400 is therefore added to title 24, as follows:

PART 1400—FEDERAL MOBILE HOME CONSTRUCTION AND SAFETY STANDARDS

Subpart A—General

Sec.
1420.010 Scope.
1420.020 Definitions.
1420.030 Acceptance of plans.
1420.040 Incorporation by reference.
1420.050 Data plate.

Subpart B—Planning Considerations

1421.010 Scope.
1421.020 Definitions.
1421.030 Light and ventilation.
1421.040 Ceiling heights.
1421.050 Exit Facilities; exterior doors.
1421.051 Exit Facilities; egress windows.
1421.060 Interior privacy.
1421.061 Interior passage.
1421.070 Space planning.
1421.071 Room requirements.
1421.072 Minimum room dimension.
1421.073 Toilet compartments.
1421.074 Hallways.
1421.080 Glass and glazed openings.

Subpart C—Fire Safety

1422.010 Scope.
1422.020 Definitions.
1422.030 Flame spread limitations and combustibility.
1422.040 Kitchen cabinet protection.
1422.050 Carpeting.
1422.060 Firestopping.
1422.070 Fire detection equipment.

Subpart D—Body and Frame Construction Requirements

1423.010 Scope.
1423.020 Definitions.
1423.030 General requirements.
1423.040 Materials.
1423.050 Structural design requirements.
1423.060 Windstorm protection.
1423.070 Resistance to elements and use.
1423.080 Condensation control.
1423.090 Thermal protection.
1423.091 Air infiltration.
1423.092 Heat loss.
1423.093 Comfort heat gain.
1423.094 Heat loss, heat gain and cooling load calculations.
1423.095 Criteria in absence of specific criteria.
1423.096 Heat loss certificate.
1423.097 Comfort cooling certificate and information.
1423.098 Ventilation.
1423.100 Testing.
1423.101 Structural load tests.
1423.102 Test procedure for roof trusses.
1423.103 Standard for windows.
1423.104 Egress windows.
1423.105 Exterior passage doors.

Subpart E—Plumbing Systems

1424.010 Scope.
1424.020 Definitions.
1424.030 General requirements.
1424.040 Materials.
1424.050 Joints and connections.
1424.060 Traps and cleanouts.
1424.070 Plumbing fixtures.
1424.080 Hangers and supports.
1424.090 Water distribution systems.
1424.100 Drainage systems.
1424.110 Vents and venting.
1424.120 Test and inspection.

Subpart F—Heating, Cooling and Fuel Burning Systems

1425.010 Scope.
1425.020 Definitions.
1425.030 Minimum standards.
1425.040 Fuel supply systems.
1425.050 Piping systems.
Sec.
1425.051 Gas piping.
1425.052 Oil piping systems.
1425.060 Appliances.
1425.061 Heat producing appliances.
1425.062 Clothes dryers.
1425.063 Installation of appliances.
1425.064 Ventilating, ventilation and combustion air.
1425.065 Instructions.
1425.066 Marking.
1425.067 Accessibility.
1425.068 Appliances, cooling.
1425.069 Circulating air system.

Subpart C—Electrical Systems

1426.010 Scope.
1426.020 Definitions.
1426.030 Power supply.
1426.040 Disconnecting means and branch-circuit protective equipment.
1426.050 Branch circuits required.
1426.060 Receptacle outlets.
1426.070 Fixtures and appliances.
1426.080 Wiring methods and materials.
1426.090 Grounding.
1426.100 Electrical testing.
1426.110 Calculations.
1426.120 Wiring of expandable units and dual units.
1426.130 Outdoor outlets, fixtures, air conditioning equipment, etc.
1426.140 Painting of wiring.
1426.150 Polarization.
1426.160 Examination of equipment for safety.

Subpart H—Transportation

1427.010 Scope.
1427.020 Definitions.
1427.030 General requirements for designing the structure to withstand transportation shock and vibration.
1427.040 Specific requirements for designing the transportation system.

AUTHORITY: Sec. 7(d), Department of Housing and Urban Development Act, 42 U.S.C. 3535(d), Title VI, Housing and Community Development Act of 1974, (42 U.S.C. 5401)

Subpart A—General

§ 1420.010 Scope.

This standard covers all equipment and installations in the design, construction, fire safety, plumbing, heat-producing and electrical systems of mobile homes which are designed to be used as dwelling units. The Secretary may approve such equipment and installations which are listed or labeled by an approved testing or listing agency. Equipment and installations not listed or labeled may be approved by the Secretary upon a determination that such equipment and installations are adequate for the protection of health, safety and the general welfare.

§ 1420.020 Definitions.

(a) Definitions in this subpart are those common to all Subparts of the standard and are in addition to the definitions provided in individual subparts.

(1) "Approved," when used in connection with any material, appliance or construction, means complying with the requirements of the Department of Housing and Urban Development.

(2) "Center" means the midline between the right and left side of a mobile home.

(3) "Certified." See "listed."

(4) "Combustible Material" means materials made of, or surfaced with, wood, compressed paper, plant fibers, or other material that will ignite and burn. Such materials shall be considered as combustible even though flameproofed, fire-retardant treated, or plastered.

(5) "Defect" includes any defect in the performance, construction, components, or material of a mobile home that renders the home or any part thereof not fit for the ordinary use for which it was intended.

(6) "Department" means the Department of Housing and Urban Development.

(7) "Dwelling Unit" means one or more habitable rooms which are designated to be occupied by one family with facilities for living, sleeping, cooking and eating.

(8) "Equipment" includes materials, appliances, devices, fixtures, fittings or accessories both in the construction of, and in the fire safety, plumbing, heat-producing and electrical systems of mobile homes.

(9) "Federal mobile home construction and safety standard" means a reasonable standard for the construction, design, and performance of a mobile home which meets the needs of the public including the need for quality, durability, and safety.

(10) "Imminent safety hazard" means a hazard that presents an imminent and unreasonable risk of death or severe personal injury.

(11) "Installations" means all arrangements and methods of construction, as well as fire safety, plumbing, heat-producing and electrical systems used in mobile homes.

(12) "Labeled" means a label, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling is indicated compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

(13) "Length of Mobile Home." The distance measured from the extreme front to the extreme rear of vehicle (including expandable rooms, hitch, coupling, tongue, and other attachments) unless otherwise specified therein.

(14) "Listed or Certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

(15) "Manufacturer" means any person engaged in manufacturing or assembling mobile homes, including any person engaged in importing mobile homes for resale.

(16) "Mobile Home" means a structure, transportable in one or more sections, which is eight body feet or more in width and is thirty-two body feet or more in length, and which is built on a permanent chassis, and designed to be used as a dwelling with or without permanent foundation, when connected to the required utilities, and includes the plumbing, heating, air-conditioning, and electrical systems contained therein.

(17) "Mobile Home Construction" means all activities relating to the assembly and manufacture of a mobile home including, but not limited to, those relating to durability, quality and safety.

(18) "Mobile Home Safety" means the performance of a mobile home in such a manner as to protect the public against any unreasonable risk of accidents due to the design or construction of such mobile home, or against unreasonable risk of death or injury to the user or to the public if such accidents do occur.

(19) "Registered Engineer or Architect means a person engaged in the professional practice of rendering service or creative work requiring education, training and experience in engineering sciences and the application of special knowledge of the mathematical, physical and engineering sciences in such professional or creative work as consultation, investigation, evaluation, planning or design and supervision of construction for the purpose of securing compliance with specifications and design for any such work.

(20) "Secretary" means the Secretary of Housing and Urban Development, or an official of the Department delegated the authority of the Secretary with respect to Title VI of Pub. L. 93-383.

(21) "State" includes each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, the Virgin Islands, the Canal Zone, and American Samoa.

§ 1420.030 Acceptance of plans.

(a) Each manufacturer of mobile homes shall submit the building plans for every model of such mobile home to the Secretary, or Secretary's designee, for the purpose of inspection for conformance to this standard.

(b) The manufacturer shall certify that each such building plan meets the Federal construction and safety standard in force at that time before the mobile home involved is produced.

(c) Regulations pertaining to enforcement of these standards and to labeling of mobile homes shall be as prescribed by the Secretary.

§ 1420.040 Incorporation by reference.

(a) The specifications, standards and codes of agencies of the U.S. Government, to the extent they are incorporated by reference in this standard, have the same force and effect as this standard. Wherever reference standards and this standard are inconsistent, the requirements of the standard prevail to the extent of the inconsistency.

(b) The abbreviations and sources of these referenced standards, specifications and codes appear below:

AA—The Aluminum Association, 750 Third Avenue, New York, N.Y. 10017
AGA—Standards and Tentative Standards published by the American Gas Association, Inc. Laboratories, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131
AHA—American Hardboard Association, 20 North Wacker Drive, Chicago, IL.
AISC—American Institute of Steel Construction, 101 Park Avenue, New York, New York 10017
AISI—American Iron and Steel Institute, 150 East 42nd Street, New York, New York 10017
AITC—American Institute of Timber Construction, 333 W. Hampden Avenue, Englewood, Colorado 80110
ANSI—American National Standards Institute, 1430 Broadway, New York, New York 10017
APA—American Plywood Association, 1119 A Street, Tacoma, Wash. 98401
ASHRAE—American Society of Heating, Refrigeration and Air-conditioning Engineers, 345 East 47th Street, New York, New York 10017
ASME—Standards and Tentative Standards published by the American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017
ASTM—American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa. 19103
AWS—American Welding Society, 2501 NW 7th Street, Miami, Fla. 33125
DOC—Department of Commerce
CS—Commercial Standards—available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
PS—Product Standard—available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
DOT—Regulations published in the Federal Code of Regulations for the Department of Transportation. Title 49, Parts 171-190 of the FCR are applicable. Available from the U.S. Government Printing Office, Washington, D.C. 20402
FS—Federal Specification—available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
HPMA—Hardwood Plywood Manufacturers Association, P.O. Box 6246, Arlington, Virginia 22206
IAPMO—International Association of Plumbing and Mechanical Officials, 5032 Alhambra Ave., Los Angeles, CA 90032
I-SANTA—Industrial Staple and Nail Technical Association, P.O. Box 3072, City of Industry, California 91744
NFPA—National Fire Protection Association, 470 Atlantic Avenue, Boston, MA.
(N)FPA—National Forest Products Association (formerly National Lumber Manufacturers Assn.), 1619 Massachusetts Ave., N.W., Wash., D.C. 20036
NPA—National Particleboard Association, 2306 Perkins Place, Silver Spring, Md. 20910
PFS—Product Fabricator Service, Inc., 1119 A Street, Tacoma, Wash. 98401
SJI—Steel Joist Institute, 2001 Jefferson Davis Highway, Arlington, Va. 22202
TPI—Truss Plate Institute, 919 Eighteenth Street, NW., Washington, D.C. 20006
UL—Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611

§ 1420.050 Data plate.

(a) Each mobile home shall bear a data plate affixed in a permanent manner near the main electrical panel or other readily accessible and visible location. Data plates shall bear not less than the following information:

(1) The manufacturer's name and address.

(2) The serial number and the model number of the unit and date the unit was manufactured.

(3) The statement, "The mobile home is designed to comply with the Federal mobile home construction and safety standard in force at the time of manufacture."

(4) Factory installed equipment, the manufacturer's name and the model designation of major factory-installed appliances.

(5) Reference to the structural zone and wind zone for which the home is designed and duplicates of the maps set forth in § 1423.050(c)(4).

Subpart B—Planning Considerations

§ 1421.010 Scope.

This Subpart B states the planning requirements in mobile homes. The intent of this subpart is to assure the adequacy of architectural planning considerations which assist in determining a safe and healthful environment.

§ 1421.020 Definitions.

(a) "Gross Floor Area" means all space, wall to wall, including recessed entries and areas under built-in vanities and similar furniture. Where the ceiling height is less than that specified in § 1421.040, the floor area under such ceilings shall not be included. Floor area of closets shall not be included in the gross floor area.

(b) "Habitable Room" means a room or enclosed floor space arranged for living, eating, food preparation, or sleeping purposes not including bathrooms, foyers, hallways, and other accessory floor space.

(c) "Laundry Area" means an area containing or designed to contain either a laundry tray, clothes washer and/or clothes dryer.

§ 1421.030 Light and ventilation.

Provisions shall be made for adequate light and ventilation in accordance with the following:

(a) Habitable Rooms shall be provided with exterior windows and/or doors having a total glazed area of not less than 8 percent of the gross floor area. An area equivalent to not less than 4 percent of the gross floor area shall be available for unobstructed ventilation. Glazed areas need not be openable where a mechanical ventilation system is provided and is capable of producing a change of air in the room(s) every 30 minutes with not less than one-fifth of the air supply taken from outside the mobile home. Windows and doors used for light or ventilation shall open directly to the outside of the home.

(b) Kitchens may be provided with artificial light and mechanical ventilation capable of producing a change of air in the room every 30 minutes.

(c) Bathroom and Toilet Compartments. Each bathroom and toilet compartment shall be provided with artificial light and, in addition, be provided with external windows or doors having not less than 1½ sq. ft. of fully openable glazed area, except where a mechanical ventilation system is provided capable of producting a change of air every 12 minutes. Any mechanical ventilation system shall exhaust directly to the outside of the mobile home.

§ 1421.040 Ceiling heights.

(a) Every habitable room and bathroom shall have a minimum ceiling height of not less than 7 feet, 0 inches for a minimum of 50 percent of the room's floor area. The remaining area may have a sloping ceiling with a minimum height of 5 feet, 0 inches. Minimum height under dropped ducts, beams, etc., shall be 6 feet, 4 inches.

(b) Hallways and foyers shall have a minimum ceiling height of 6 feet, 6 inches.

§ 1421.050 Exit facilities; exterior doors.

(a) *Number and location of exterior doors.* Mobile homes shall have a minimum of two exterior doors.

(1) Required egress doors shall not be located in rooms where a lockable interior door must be used in order to exit.

(2) Both egress doors shall not be located in the same room or in areas not separated by fixed walls such as in a combined living-dining area.

(b) *Door design and construction.* (1) Exterior doors shall be constructed for exterior use in accordance with the "Standard for Swinging Exterior Passage Doors for Use in Mobile Homes," § 1423.-105.

(2) Exterior doors shall provide a minimum 28 inch wide by 74 inch high clear opening.

(3) Each swinging exterior door other than screen or storm doors shall have a key-operated lock that has a deadlocking latch or a key-operated dead bolt with a passage latch. Locks shall not require the use of a key for operation from the inside.

(4) All exterior doors, including storm and screen doors, opening outward shall be provided with a safety door check.

§ 1421.051 Exit facilities; egress windows.

(a) Every room designed expressly for sleeping purposes, unless it has an exit door (See § 1421.050), shall have at least ont outside window which meets the requirements of the "Standard for Egress Windows for Use in Mobile Homes" (§ 1423.104).

(b) The bottom of the window opening shall not be more than 36 inches above the floor.

(c) Locks, latches, or operating handles shall be located not in excess of 60 inches from the finished floor.

§ 1421.060 Interior privacy.

Bathroom, toilet compartment, and primary bedroom doors shall be equipped with a privacy lock.

§ 1421.061 Interior passage.

(a) Interior doors having passage hardware without a privacy lock, or with a privacy lock not engaged, shall open from either side by a single movement of the hardware mechanism in any direction.

(b) Each mobile home interior door, when provided with a privacy lock, shall have a privacy lock that has an emergency release on the outside to permit entry when the lock has been locked by a locking knob, lever, button, or other locking device on the inside.

§ 1421.070 Space planning.

The dimensions set forth in this paragraph are intended to assure that space and a functional arrangement of this space are provided to accommodate the normal activities of living in the mobile home.

§ 1421.071 Room requirements.

(a) Every mobile home shall have at least one habitable room with not less than 150 sq. ft. of gross floor area.

(b) Rooms designed for sleeping purposes shall have a minimum gross square foot floor area as follows:

(1) One person	50
(2) Two persons	70
(3) For each person in excess of two	50

(c) Every room designed for sleeping purposes shall have accessible clothes hanging space with a minimum inside depth of 22 inches and shall be equipped with a rod and shelf.

§ 1421.072 Minimum room dimension.

No habitable room, except a kitchen, shall have less than five feet in any clear horizontal dimension.

§ 1421.073 Toilet compartments.

Each toilet compartment shall be a minimum of 30 inches in width and have at least 21 inches of clear space in front of each toilet.

§ 1421.074 Hallways.

Hallways shall have a minimum horizontal dimension of 28 inches measured from the interior finished surface to the interior finished surface of the opposite wall. When appliances are installed in a laundry area, the measurement shall be from the front of the appliance to the opposite finished interior surface. When appliances are not installed and a laundry area is provided, the area shall have a minimum depth of 30 inches in addition to the 28 inches required for the passage. Minor protrusions into the minimum hallway width by doorknobs, trim, smoke detectors or light fixtures are permitted.

§ 1421.080 Glass and glazed openings.

(a) *Windows and sliding glass doors.* All windows and sliding glass doors shall meet the requirements of the "Standard for Windows Used in Mobile Homes," § 1423.103.

(b) *Safety glazing.* Glazing in all sliding glass door units (fixed or moving sections), unframed glass doors, mirrored wardrobe doors, shower and bathtub enclosures, storm doors, and in panels located within 12 inches on either side of exit or entrance doors and less than 18 inches above the floor shall be of a safety glazing material. Glazing in exit and entrance doors in which the glazing is located below 3 feet 6 inches above the floor shall be of safety glazing material. Where annealed glass is permitted in doors, it shall be at least single strength (ss) in thickness. If the short dimension is larger than 24 in., annealed glass must be double strength (ds) or thicker. Safety glazing material is considered to be any glazing material capable of passing the requirements of ANSI Z97.1.

Subpart C—Fire Safety

§ 1422.010 Scope.

The purpose of this Subpart C of this standard is to specify measures which will provide a reasonable degree of safety from fire for the occupants. It is the intent of this Subpart that mobile homes shall be constructed so as to reduce fire hazards and provide detection of a fire for safe egress.

§ 1422.020 Definitions.

(a) The following definitions are applicable to § 1422.000 only:

(1) "Flame Spread" means the propagation of flame over a surface.

(2) "Smoke Detector" means wall mounted detector of the ionization chamber or photoelectric type which detects visible or invisible particles of combustion and operates from the 120 VAC source of electrical power supply at the point of installation.

(3) "Single Station Alarm Device" means an assembly incorporating the detector sensor, the electrical control equipment requirement, and the alarm-sounding device in one unit.

§ 1422.030 Flame spread limitations and combustibility.

(a) The surface flame spread rating of interior finish materials shall not exceed the following when tested by the Standard Method of Test for Surface Burning Characteristics of Building Materials, ASTM E84 for large panels or Surface Flammability of Materials Using a Radiant Heat Energy Source ASTM E162 for items such as kitchen cabinets, bathtubs and shower units. Testing shall be by an independent testing laboratory or recognized association laboratory.

(1) All wall surfaces (excluding moldings, trim and door or series of doors not exceeding 4 feet in width) of habitable rooms, foyers, bathrooms and utility rooms shall not exceed 200 flame spread rating.

(2) All ceiling surfaces shall not exceed 200 flame spread rating.

(3) Walls and ceilings of furnace and water heater spaces including doors shall not exceed a flame spread rating of 25.

(4) Kitchen cabinet doors (excluding rails, stiles, mullions and toe strips), counter tops and exposed bottoms and end panels shall not exceed 200 flame spread rating.

(5) Exposed wall surfaces adjacent to the cooking range or top shall not exceed 25 flame spread rating. Adjacent surfaces are exposed wall surfaces extending up from the counter top or to the bottom of the overheated cabinet, whichever is less, and extending the full width of the cooking range or top including any return wall or cabinet which is within 6 inches of the edge of the cooking range or top burners.

(6) Finish surfaces of plastic bathtubs and shower units and doors shall not exceed 200 flame spread rating.

(b) Wall and ceiling surface materials of the furnace and water heater spaces including doors and exposed wall surface materials adjacent to the cooking range or top as defined in § 1422.030(a)(5) shall be surfaced with limited combustible material as defined in NFPA 220. The thickness of the surface material shall be at least 5/16 inch (5/16 inch gypsum wallboard or equivalent). At furnace and water heater spaces all openings for pipes and vents shall be tight fitted or firestopped.

§ 1422.040 Kitchen cabinet protection.

(a) The bottom and sides of combustible kitchen cabinets over cooking ranges or tops including a space of 6 inches from the edge of the burners shall be protected with at least ¼ inch thick asbestos millboard covered with not less than 26 gage sheet metal (.017 stainless steel, .024 aluminum, or .020 copper) or equivalent protection. The protective metal over the range shall form a hood with not less than a 3 inch eyebrow (measuring horizontally from face of cabinet). The hood shall be centered over and at least as wide as the cooking range or top.

§ 1422.050 Carpeting.

(a) Surface flammability of carpets and rugs shall at least meet the Department of Commerce Standard DOC FF 1 test.

(b) Carpeting shall not be used under a heat-producing appliance.

§ 1422.060 Firestopping.

(a) Firestopping shall be provided to cut off all concealed draft openings in all stud walls and partitions, including furred spaces, so placed that the maximum vertical dimension of any concealed space is not over eight feet.

§ 1422.070 Mobile home fire detection equipment.

(a) *General.* At least one smoke detector (which may be a single-station smoke detector) shall be installed in each mobile home to protect each separate bedroom area.

(b) *Smoke detector location.* A smoke detector shall be installed in the hallway or space communicating with the bedroom area. The specific location shall be in the hallway between the living area and the first bedroom door. Mobile homes having bedrooms separated by any one or combination of common use areas such as kitchen, dining room, living room, or family room (but not a bathroom or utility room), shall have at least two smoke detectors, one detector protecting each bedroom area.

(c) *Smoke detectors.* Smoke detectors shall be either the ionization chamber or the photoelectric wall mounted type and shall comply with all the requirements of Underwriters' Laboratories Standard No. 217. Detectors shall bear the label of a testing and approval laboratory that indicates the smoke detectors have been tested and approved under the requirements of UL 217. The testing and approved laboratory shall be one which maintains a periodic follow-up service of the labeled devices to ensure compliance with the original approval.

(d) *Installation.* Smoke detectors shall be installed on an interior wall of the mobile home, 6 to 12 inches from the ceiling. The detector mounting shall be permanently attached to an electrical outlet box and the detector wired into a general electrical circuit. There shall be no switches in the circuit to the detector other than the circuit breaker serving the circuit.

Subpart D—Body and Frame Construction Requirements

§ 1423.010 Scope.

This Subpart D covers the minimum requirements for materials, products, equipment and workmanship needed to assure that the mobile home will provide (a) the structural strength and rigidity, (b) the protection against corrosion, decay, insects and other similar destructive forces, (c) protection against the hazards of windstorm, (d) resistance to the elements, and (e) durability and economy of maintenance.

§ 1423.020 Definitions.

(a) The following definitions are applicable to § 1423.000 only:

(1) "Anchoring Equipment" means straps, cables, turnbuckles, and chains, including tensioning devices, which are used with ties to secure a mobile home to ground anchors.

(2) "Anchoring System" means a combination of ties, anchoring equipment, and ground anchors that will, when properly designed and installed, resist overturning and lateral movement of the mobile home from wind forces.

(3) "Diagonal Tie" means a tie intended to primarily resist horizontal or shear forces and which may secondarily resist vertical, uplift and overturning forces.

(4) "Footer" means that portion of the support system that transmits loads directly to the soil.

(5) "Ground Anchor" means any device at the mobile home stand designed to transfer mobile home anchoring loads to the ground.

(6) "Hurricane Resistive Mobile Home" means a mobile home which meets the wind design load requirements for Zone II in § 1423.050(c)(2).

(7) "Interior Finish" means the surface material of walls, fixed or movable partitions, ceilings and other exposed interior surfaces affixed to the mobile home structure including any material such as paint or wallpaper. Interior finish does not include decorations or fur-

nishings which are not affixed to the mobile home structure.

(8) "Loads" (i) "Dead Loads" means the weight of all permanent construction including walls, floors, roof, partition, and fixed service equipment. (ii) "Live Load" means the weight superimposed by the use and occupancy of the mobile home, including wind load and snow load, but not including dead load. (iii) "Wind Load" means the lateral or vertical pressure or uplift on the mobile home due to wind blowing in any direction.

(9) "Main Frame" means the structural component on which is mounted the body of the mobile home.

(10) "Mobile Home Stand" means that area of a mobile home lot which has been reserved for the placement of a mobile home.

(11) "Pier" means that portion of the support system between the footer and the mobile home exclusive of caps and shims.

(12) "Pressure Envelope" means that envelope surrounding the living space which serves to limit air leakage. In ventilated cavities, the pressure envelope is the interior skin.

(13) "Sheathing" means material which is applied on the exterior side of a building frame under the exterior weather resistant covering.

(14) "Stabilizing Devices" means all components of the anchoring and support systems such as piers, footers, ties, anchoring equipment, ground anchors, and any other equipment which supports the mobile home and secures it to the ground.

(15) "Support System" means a combination of footers, piers, caps, and shims that will, when properly installed, support the mobile home.

(16) "Thermal Envelope Area" means the surface area of the thermal envelope is the sum of the surface areas of walls, ceiling and floor. The wall area is measured by outside wall length by inside wall height from floor to ceiling. The floor and ceiling areas are considered as horizontal surfaces using outside width and length.

(17) "Tie" means strap, cable or securing device used to connect the mobile home to ground anchors.

(18) "Vertical Tie" means a tie intended to primarily resist the uplifting and overturning forces.

(19) "Windstorm Resistive Mobile Home" means a mobile home which meets the wind design load requirements for Zone II in § 1423.050(c) (2).

§ 1423.030 General requirements.

(a) *Minimum requirements.* The design and construction of a mobile home shall conform with the provisions of this standard. Requirements for any size, weight, or quality of material modified by the terms of "minimum," "not less than," "at least," and similar expressions are minimum standards. The manufacturer or installer may exceed these standards provided such deviation does not result in any inferior installation or defeat the purpose and intent of this standard.

(b) *Construction.* All construction methods shall be in conformance with accepted engineering practices to insure durable, livable, and safe housing and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.

(c) *Structural analysis.* The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur during transportation and on site. (See §§ 1423.100 and 1427.100).

(d) *Windstorm or hurricane resistive design.* Only mobile homes which meet the applicable requirements of § 1423.050 (c) may be designated "Designed for Windstorm or Hurricane Zone." No similar designation which would imply hurricane or windstorm resistance shall be used when the mobile home does not meet these requirements.

(e) *New materials and methods.* (1) Any new material or method of construction not provided for in this standard and any material or method of questioned suitability, proposed for use in the manufacture of the structure, shall nevertheless conform in performance to the requirements of this standard.

(2) Unless based on accepted engineering design for the use indicated all new mobile home materials, equipment systems or methods of construction not provided for in this standard shall be subjected to the tests specified in paragraph (g) of this section.

(f) *Allowable design stress.* The design stresses of all materials shall conform to accepted engineering practice. The use of materials not identified as to strength or stress grade shall be limited to the minimum allowable stresses under accepted engineering practice.

(g) *Alternate test procedures.* In the absence of listed and prescribed standards, the manufacturer shall develop or cause to be developed necessary tests to demonstrate the structural properties and the significant characteristics of the method employed. Such tests shall be made either by a recognized testing organization or by a registered professional engineer or registered architect. Copies of the test results shall be kept on file by the mobile home manufacturer.

(h) Assembly of multiple units at the site shall be in accordance with the manufacturers instructions, and shall be performed in a workmanlike manner using all fasteners, sealants, etc., as specified by the manufacturer.

§ 1423.040 Materials.

(a) Dimension and board lumber shall not exceed 19% moisture content at time of installation.

(b) Standards for materials and methods of assembly are listed in the following Table. Material and installations conforming to these standards or other approved standards may be considered acceptable when listed or labeled and installed in accordance with the requirements of this Subpart and the conditions of this approval, except where otherwise provided herein.

Aluminum:	
Aluminum construction manual, specifications for aluminum structures.	AA-1971.
Steel:	
Specification for the design, fabrication and erection of structural steel for buildings.	AISC-1969.
Specification for the design of cold-formed steel structural members.	AISI-1968.
Specification for the design of light-gage cold-formed stainless steel structural members.	AISI-1968.
Standard specifications for open web steel joists, J- and H-series.	A15C and SJ1-1970.
Structural welding code	AWS D1.0-72.
Wood and wood products:	
Hardboard	AHA PS 58, 59, and 60-1973.
Hardwood and decorative plywood	USDC PS 51-71.
Structural design guide for hardwood plywood	HPHA-SG-71.
Timber, structural glued laminated—Inspection	AITC-200-1973.
Timber, structural glued laminated	USD PS 56-73.
Softwood plywood—Construction and industrial	PS 1-74.
Plywood construction systems for commercial and industrial buildings (APA).	P310-1973.
Residential construction guide (APA)	P450-1973.
Design methods for plywood-lumber components (V 815)	APA,1972.
Fabrication of plywood-lumber components (V820)	APA,1972.
Stress grade lumber and its fastenings—National design specifications for.	(N) FPA-1973.
Structural design data—Wood	(N) FPA-1970.
Span tables for joists and rafters (PS 20-70)	(N) FPA-1970.
Working stresses for joists and rafters	(N) FPA-1971.
Timber construction standards	AITC-100-1972.
Design specifications for light metal plate connected wood trusses.	TPI-70.
Span tables for light metal plate connected wooden trusses	TPI, 1972.
Particleboard for mobile home decking	NPA 1-73.
Mat-formed wood particleboard	CS 236-66.
All plywood beams for mobile homes	APA 124-74.
Other:	
Gypsum wallboard	ASTM C36.
Caulking and sealants	

Fasteners:	
Nails, brads, staples and spikes, wire, cut and wrought	F.S.PP-N-105b.
Pneumatic and mechanically driven building construction fasteners.	I-SANTA 2-19-73.
Windows and glazing:	
Transparent safety glazing material used in buildings	ANSI Z97.1-1972.
Unclassified:	
ASHRE Handbook of Fundamentals—1972 building code requirements for minimum design loads in buildings and other structures.	ANSI A58.1-1972.

§ 1423.050 Structural design requirements.

(a) Each mobile home shall be designed and constructed as a completely integrated structure capable of sustaining the design load requirements of this standard and shall be capable of transmitting these loads to stabilizing devices without causing an unsafe or abnormal deformation of the structure or its structural parts. The mobile home shall be capable of withstanding the adverse effects of transportation shock and vibration, both as an integrated structure and to its component parts, during its normal life. See § 1427.030.

(b) Design Loads. (1) Design dead loads shall be the actual dead load supported by the structural assembly under consideration. (2) Design Live Loads. The design live loads and wind and snow loads shall be as specified in this section and shall be considered to be uniformly distributed. The roof live load or snow load shall not be considered as acting simultaneously with the wind load and the roof live or snow load and floor live loads shall not be considered as resisting the overturning moment due to wind. (3) When engineering calculations are performed, allowable unit stresses may be increased as provided in the documents referenced in § 1423.040.

(c) Wind, Snow and Roof Loads.

(1) Standard Wind (Zone I). When a mobile home is not designated as "Windstorm or Hurricane-Resistive," the mobile home and each wind resisting part and portion thereof shall be designed for total horizontal wind loads of 15 psf and total vertical upward loads of 9 psf.

(2) Windstorm and/or Hurricane Resistive (Zones II and III). When a mobile home is designated as "Windstorm Resistive" or "Hurricane Resistive," the home and each wind resisting part and portion thereof shall be designed for the following total wind loads:

	Windstorm Resistive (pounds per square foot)
Zone II:	
Horizontal	20
Vertical upward	12
Zone III:	

	Hurricane Resistive (pounds per square foot)
Zone III:	
Horizontal	25
Vertical upward	15

(3) Roof Loads. (i) Flat, curved and pitched roofs shall be designed to resist the following live loads, applied downward on the horizontal projection as appropriate for the design zone marked on the mobile home:

	Pounds per square foot
North Zone	40
Middle Zone	30
South Zone	20

(ii) For exposures in mountainous areas where snow records or experience indicate significant differences from the snow loads stated above, the Department may establish more stringent requirements, with the increased snow load based upon 0.6 times the ground snow load, for homes known to be destined for such areas.

(4) The Data Plate posted in the mobile home (See § 1420.050) shall show for which structural zone(s) of the U.S.A. the mobile home has been designed and the actual design external snow and/or wind live loads. The Data Plate shall include reproductions of the Load Zone Maps shown in this Section and related information. The Load Zone Maps shall be not less than one-half the size illustrated.

(d) Design Load Deflection. When a structural assembly is subjected to total design live loads, the deflection for structural framing members shall not exceed the following:

Floor	L/240
Roof and ceiling	L/180
Headers, beams and girders (vertical load)	L/180
Walls and partitions	L/180

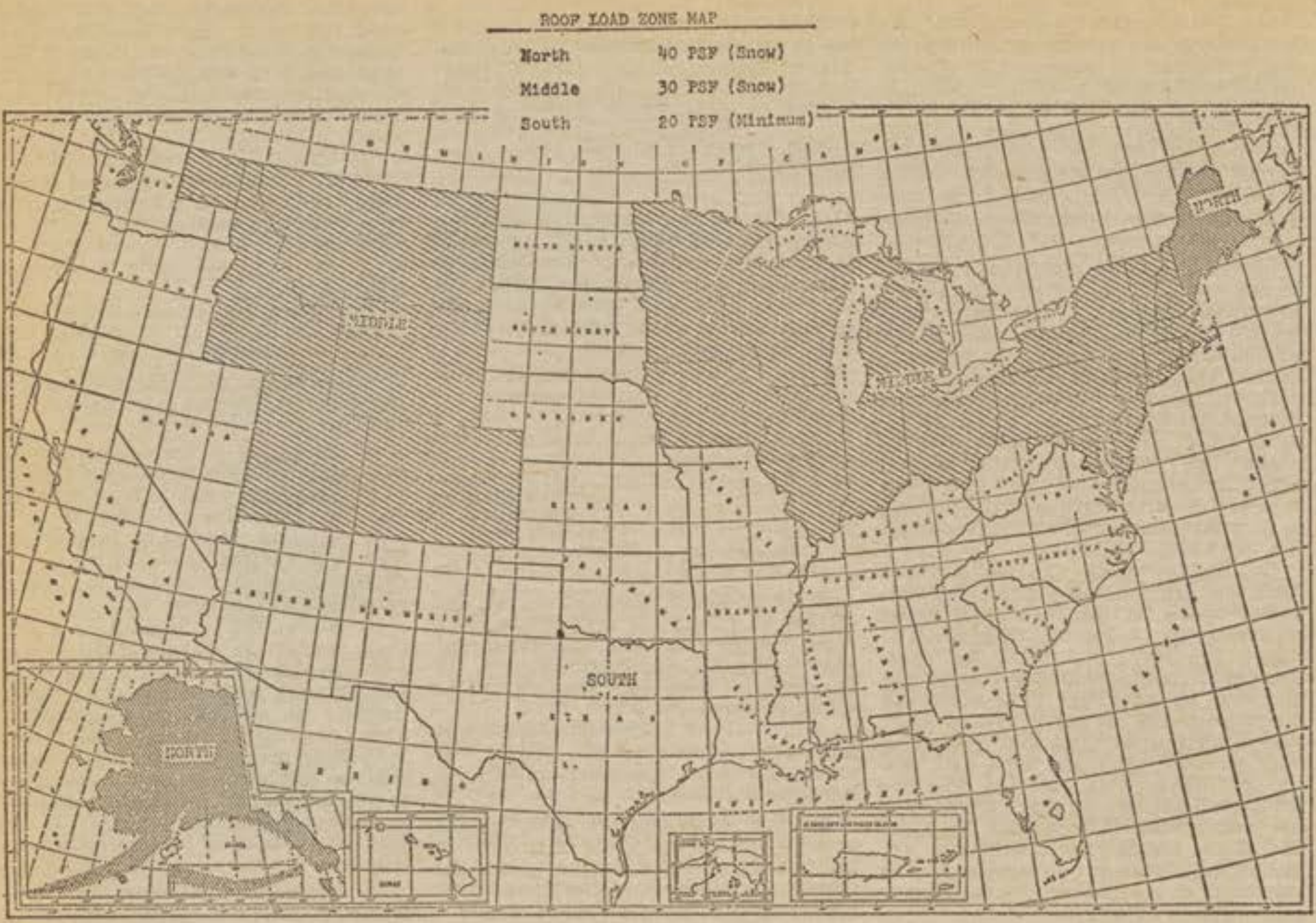
Where L equals the clear span between supports or two times the length of a cantilever.

(e) Fastening of Structural Systems. Roof framing shall be securely fastened to wall framing, walls to floor structure, and floor structure to chassis to secure and maintain continuity between the floor and chassis, so as to resist wind overturning and sliding as imposed by design loads in this part.

(f) Walls. The walls shall be of sufficient strength to withstand the load requirements as defined in § 1423.050(c) of this Subpart, without exceeding the deflections as specified in § 1423.050(d). The connections between the bearing walls, floor, and roof framework members shall be fabricated in such a manner as to provide support for the material used to enclose the mobile home and to provide for transfer of all lateral and vertical loads to the floor and chassis.

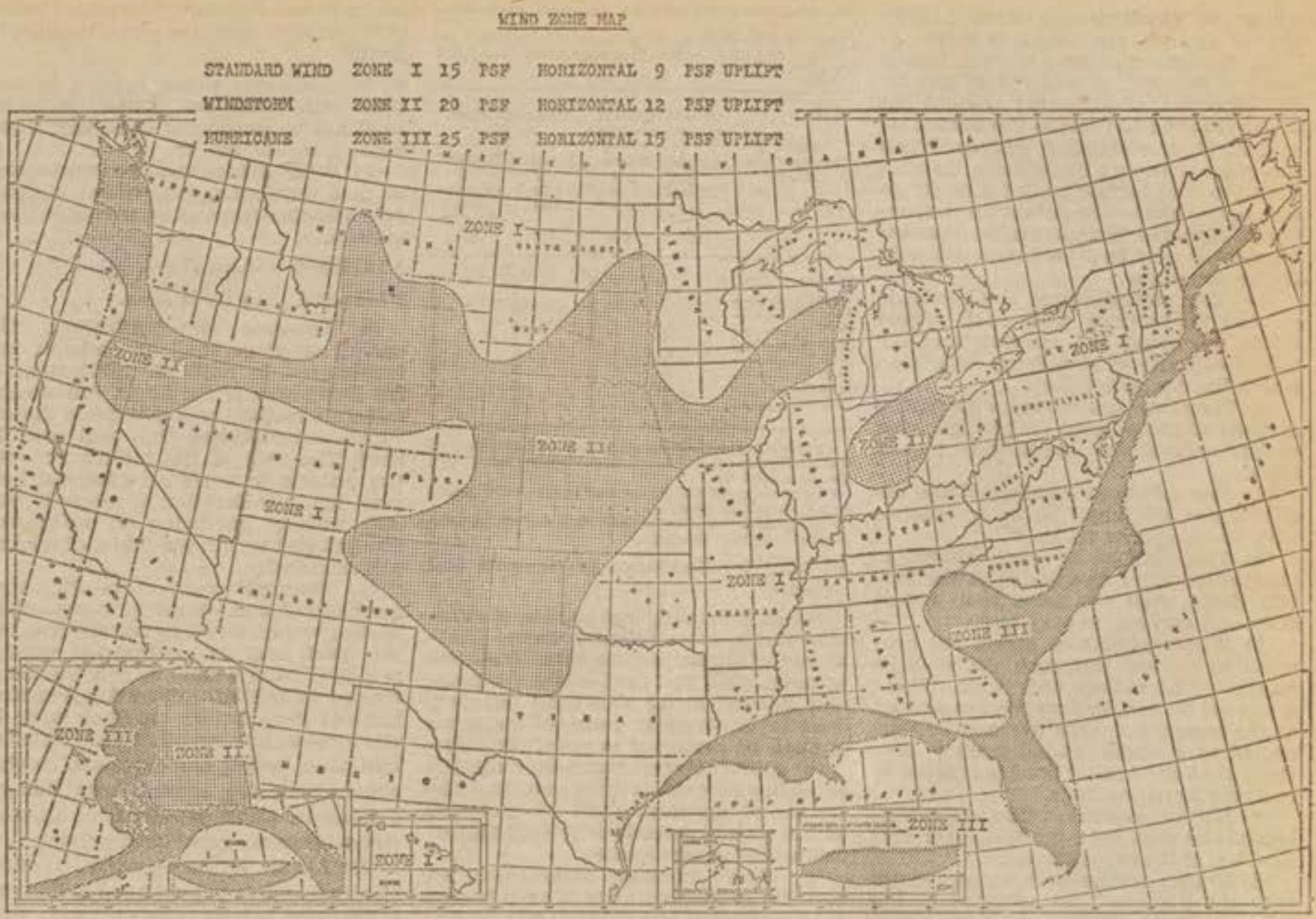
(1) Except where substantiated by engineering designs, studs shall not be notched or drilled in the middle one-third of their length.

(2) Interior walls and partitions shall be constructed with structural capacity adequate for the intended purpose and shall be capable of resisting a horizontal load of not less than five pounds per square foot.



ROOF LOAD ZONE MAP

North	40 PSF (Snow)
Middle	30 PSF (Snow)
South	20 PSF (Minimum)


WIND ZONE MAP
STANDARD WIND ZONE I 15 PSF HORIZONTAL 9 PSF UPLIFT
WINDSTORM ZONE II 20 PSF HORIZONTAL 12 PSF UPLIFT
HURRICANE ZONE III 25 PSF HORIZONTAL 15 PSF UPLIFT
ZONE I
ZONE II
ZONE III

(g) Floors. (1) Floor assemblies shall be designed in accordance with accepted engineering practice standards to support a minimum uniform live load of 40 lb/ft² plus the dead load of the materials. In addition (but not simultaneously), floors shall be able to support a 200-pound concentrated load on a two-inch diameter disc at the most critical location with a maximum deflection not to exceed one-eighth inch relative to floor framing. Perimeter joists of more than six inches depth shall be stablilized against overturning from superimposed loads as follows: At ends by solid blocking not less than two-inch thickness by full depth of joist, or by connecting to a continuous header not less than two-inch thickness and not less than the depth of the joist with connecting devices; at eight feet maximum intermediate spacing by solid blocking or by wood cross-bridging of not less than one inch by three inches, metal cross-bridging of equal strength, or by other approved methods.

(2) Wood floors or subfloors in kitchens, bathrooms (including toilet compartments), laundry rooms, water heater compartments, and any other areas subject to excessive moisture shall be moisture resistant or shall be made moisture resistant by sealing or by an overlay of nonabsorbent material applied with water-resistant adhesive.

(3) Except where substantiated by engineering design, notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of the joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span.

(4) Bottom board material (with or without patches) shall meet or exceed the level of 48 inch-pounds of puncture resistance as tested by the Beach Puncture Test in accordance with ASTM D-781-68. The material shall be suitable for patches and the patch life shall be equivalent to the material life. Patch installation instruction shall be included in the mobile home manufacturer's instructions.

(h) Roofs: (1) Roofs shall be of sufficient strength to withstand the load requirements as defined in § 1423.050 (b) and (c) without exceeding the deflections specified in § 1423.050(d). The connections between roof framework members and bearing walls shall be fabricated in such a manner as to provide support for the material used to enclose the home, to provide for the transfer of downward vertical loads to the bearing walls and to resist uplift.

(2) Roofing membranes shall be of sufficient rigidity to prevent deflection which would permit ponding of water or separation of seams due to wind, erection or transportation forces.

(3) Cutting of roof framework members for passage of electrical, plumbing or mechanical systems shall not be allowed except where substantiated by engineering analysis.

(4) All roof penetrations for electrical, plumbing or mechanical systems shall be properly flashed and sealed. In addition, where a metal roof membrane is used, a wood backer shall be installed. The backer plate shall be not less than 5/16 inch plywood, with exterior glues, secured to the roof framing system beneath the metal roof, and shall be of a size to assure that all screws securing the flashing are held by the backer plate.

§ 1423.060 Windstorm protection.

(a) Provisions for Support and Anchoring Systems. Each mobile home shall have provisions for support and anchoring systems, which, when properly designed and installed, will resist overturning and lateral movement of the mobile home as imposed by the respective design loads.

(1) The provisions of this Section shall be followed except when the support and anchoring systems are designed by a Registered Professional Engineer or Ar-

chitect, in which circumstances § 1423.060 (c) and (d) are not applicable.

(2) The manufacturer of each mobile home is required to make provision for the support and anchoring systems but is not required to provide the anchoring equipment or stabilizing devices. When the manufacturer's installation instructions provides for the main frame structure to be used as the points for connection of diagonal ties, no specific connecting devices need be provided on the main frame structure.

(b) The manufacturer shall provide printed instructions with each mobile home specifying the location and required capacity of stabilizing devices on which the design is based.

(c) The provisions made for anchoring systems shall be based on the following design criteria for single-wide mobile homes.

(1) The minimum number of ties required per side shall be in accordance with the following table.

(2) Ties shall be as evenly spaced as practicable along the length of the mobile home with not more than 8 feet open-end spacing on each end.

(3) When continuous straps are provided as vertical ties, such ties shall be positioned at rafters and studs. Where a vertical tie and diagonal tie are located at the same place, both ties may be connected to a single ground anchor, provided that the anchor used is capable of carrying both loadings.

(4) Add-on sections of expandable mobile homes shall have provisions for vertical ties at the exposed ends.

(d) Double-wide mobile homes require only the diagonal ties specified in the following Table. These shall be placed along the outer side walls.

(e) Protection shall be provided at sharp corners where the anchoring system requires the use of external cables or straps. Protection shall also be provided to minimize damage to roofing or siding by the cable or strap.

(f) Anchoring equipment shall be capable of resisting an allowable working load equal to or exceeding 3,150 pounds and shall be capable of withstanding a 50 percent overload (4,725 pounds total) without failure of either the anchoring equipment or the attachment point on the mobile home.

(g) Anchoring equipment exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coated.

(1) Slit or cut edges of zinc-coated steel strapping do not need to be zinc coated.

(2) Type 1, Class B, Grade 1 steel strapping, 1¼ inches wide and 0.035 inch thick, conforming with Federal Specification QQ-S-781-G, is judged to conform with the provisions of this paragraph.

Number of ties required per side of single wide[1] mobile homes

[This table is based on a minimum working load per anchor of 3,150 lb with a 50-percent overload (4,725 lb total).]

Length of mobile home (feet)[2] (1)	Windstorm and hurricane resistive: Number of vertical ties (2)	Windstorm and hurricane resistive: Number of diagonal ties[3] (3)	Nonhurricane resistive: Number of vertical ties (4)	Nonhurricane resistive: Number of diagonal ties[3] (5)
32 to 40	2	4	2	3
41 to 46	2	4	2	3
47 to 49	2	5	2	3
50 to 54	3	5	2	3
55 to 58	3	5	2	4
59 to 64	3	6	2	4
65 to 70	3	6	2	4
71 to 73	3	7	2	4
74 to 84	4	7	2	5

[1] Double-wide mobile homes require only the diagonal ties specified in col. 3 or 5, and these shall be placed along the outer sidewalls.

[2] Length of mobile home (as used in this table) means length excluding drawbar.

[3] Diagonal ties in this method shall deviate at least 40° from a vertical direction.

§ 1423.070 Resistance to elements and use.

(a) Exterior coverings shall be of moisture and weather resistive materials attached with corrosion resistant fasteners to resist wind and rain. Metal coverings and exposed metal structural members shall be of corrosion resistant materials or shall be protected to resist corrosion.

(b) Joints between dissimilar materials and joints between exterior coverings and frames of openings shall be protected with a sealant suitable to protect against infiltration of air or water.

(c) Where adjoining materials or assemblies of materials are of such nature that separation can occur due to expansion, contraction, wind loads or other loads induced by erection or transportation, sealants shall be of a type that maintains protection against infiltration or penetration by air, moisture or vermin.

(d) Exterior surfaces shall be sealed to resist the entrance of rodents.

§ 1423.080 Condensation control.

(a) *Ceilings*. Ceilings shall have a vapor barrier not greater than 1 perm (dry cup method) installed on the living space side of the roof cavity.

(b) *Exterior walls*. (1) Exterior walls shall have a vapor barrier not greater than 1 perm (dry cup method) installed on the living space side of the wall, or

(2) Unventilated wall cavities shall have an external covering and/or sheathing which forms the pressure envelope. The covering and/or sheathing shall have a combined permeance of not less than 5.0 perms. In the absence of test date, combined permeance may be computed using the formula:

$$P_{Total} = \frac{1}{\frac{1}{P_1} \quad \frac{1}{P_2}}$$

where P_1 and P_2 are the permeance values of the exterior covering and sheathing in perms.

Formed exterior siding applied in sections with joints not caulked or sealed shall not be considered to restrict water vapor transmission, or

(3) Wall cavities shall be constructed so that ventilation is provided to dissipate any condensation occurring in these cavities.

§ 1423.090 Thermal protection.

§ 1423.091 Air infiltration.

(a) *Envelope air infiltration*. The opaque envelope shall be designed and constructed to limit air infiltration to the living area of the home. Any design, material, method or combination thereof which accomplished this goal may be used. The goal of the infiltration control criteria is to reduce heat loss/heat gain due to infiltration as much as possible without impinging on health and comfort and within the limits of reasonable economics.

(1) *Envelope penetrations*. Plumbing, mechanical and electrical penetrations of the pressure envelope not exempted by this part, and installations of window and door frames shall be constructed or treated to limit air infiltration. Penetrations of the pressure envelope made by electrical equipment other than distribution panel boards and cable and conduit penetrations are exempt from this requirement. Cable penetrations through outlet boxes are considered exempt.

(2) *Joints between major envelope elements*. Joints not designed to limit air infiltration between wall-to-wall, wall-to-ceiling and wall-to-floor connections shall be caulked or otherwise sealed. When walls are constructed to form a pressure envelope on the outside of the wall cavity, they are deemed to meet this requirement.

§ 1423.092 Heat loss.

The mobile home heat loss shall be certified as specified in § 1423.096. The zone specified shall be determined as required in paragraph (a) of this section. The outdoor certification temperature shall be calculated as required in §§ 1423.094 and 1423.095.

(a) *Transmission heat losses*. The transmission heat losses of the mobile home at the respective zone outdoor design temperature (15 MPH wind) and indoor design temperature of 70°F, including internal and external ducts, excluding air infiltration, ventilation, and condensation control, shall not exceed the BTU/H per square foot of mobile home envelope area shown below:

Zone	Design temperature (°F)	British thermal unit per square foot of envelope area
I	0	11.0
II	−20	11.3
III	−50	12.5

Mobile homes designed for Zones II and III shall be factory equipped with storm windows or insulating glass. In addition to the above requirements, mobile home thermal insulation shall not be less than the following:

	Zone I	Zone II	Zone III
Wall	R-7	R-11	R-11
Floor	R-7	R-11	R-11
Ceiling	R-11	R-14	R-14

The use of these thermal insulation values does not ensure compliance to the BTU/Hr-Ft² of envelope area requirement.

§ 1423.093 Comfort heat gain.

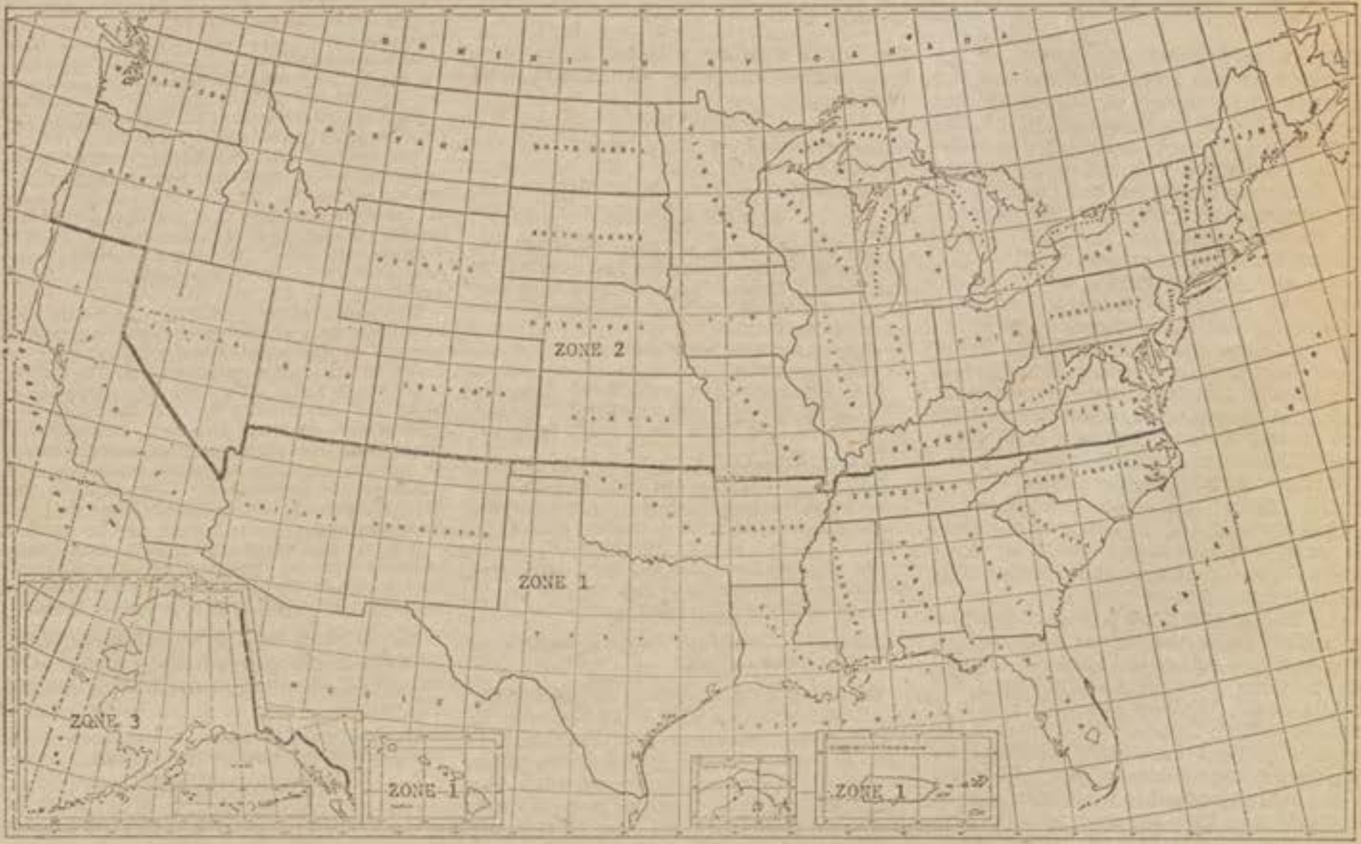
Information necessary to calculate the home cooling load shall be provided as specified in this part.

(a) *Transmission heat gains.* Homes complying with this section shall meet the minimum heat loss and insulation requirements of § 1423.092(a).

§ 1423.094 Heat loss, heat gain and cooling load calculations.

Information, values and data necessary for heat loss and heat gain determinations shall be taken from the 1972 ASHRAE Handbook of Fundamentals.

OUTDOOR WINTER DESIGN TEMPERATURE ZONES



Infiltration and Ventilation—Chapter 19
Determining "R" & "U" Value—Chapter 20
Heating Load—Chapter 21
Cooling Load Calculations—Chapter 22
Outdoor Winter Design Temperatures (Use 97½% values)—Chapter 33
Outdoor Summer Design Temperatures (Use 2½% values)—Chapter 33.

§ 1423.095 Criteria in absence of specific data.

In the absence of specific data, the following criteria shall be used:

(a) *Infiltration heat loss.* In the absence of measured infiltration heat loss data,

$$\frac{0.7 \text{ Btu}}{\text{h-ft (of perimeter)}} \times \Delta T$$

shall be used to calculate heat loss due to infiltration and intermittently operated fans exhausting to the outdoors. The perimeter calculation shall be based on the dimensions of the pressure envelope.

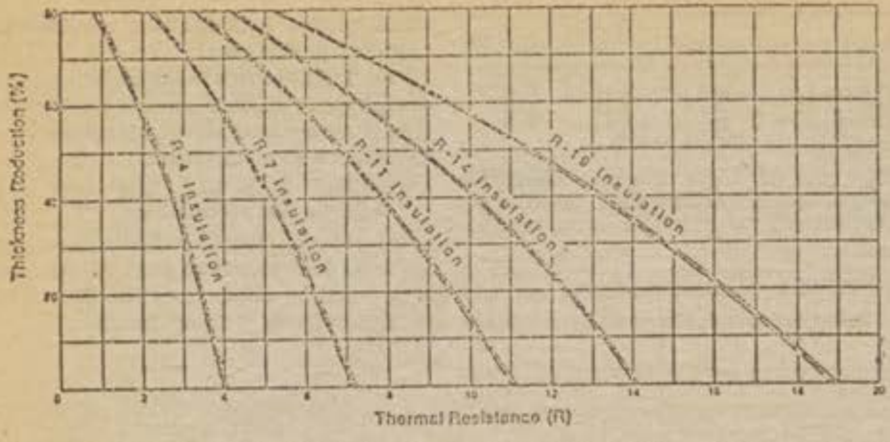
where:

ΔT=70 minus the outdoor temperature specified in the heat-loss certificate, in °F.

(b) *Framing heat loss/gain.*

Wall	15 percent of wall area less windows and doors.
Floor and ceiling	10 percent of the area.

(c) *Insulation compression.* Insulation compressed to less than nominal thickness shall have its nominal R-values reduced for that area which is compressed in accordance with the following graph:



When wide blanket insulation is installed over the framing members the thermal performance of the insulation is reduced due to compression at the framing members. The Resistance value of the insulation between the framing members is reduced by 12.5 percent for framing members 16″ O.C., 8.5 percent for framing members 24″ O.C., and 4 percent for framing members 48″ O.C.

(d) *Air supply ducts within floor cavity.* Air supply ducts located within a floor cavity shall be assumed to be heating or cooling the floor cavity to living space temperatures unless the duct is structurally isolated from the framing system or thermally insulated from the rest of the floor cavity with a thermal insulation at least equal to R-4.

(e) *Air supply ducts within ceiling cavity.* Where supply ducts are located in ceiling cavities, the influence of the duct on cavity temperatures shall be considered in calculating compliance with envelope heat loss or heat gain.

(f) The supply duct loss/gain shall be calculated using the actual duct surface area and the actual thickness of insulation between the duct and outside of the mobile home. If there is an air space of at least ½ inch between the duct and the insulation, heat loss/gain need not be calculated if the cavity in which the duct is located is assumed to be at living space temperature. The average temperature inside the supply duct, including ducts installed outside the mobile home, shall be assumed to be 130° F for purposes of calculation of heat loss and 60° F for heat gain.

(g) *Return air cavities.* Cavities used as return air plenums shall be considered to be living space temperature.

§ 1423.096 Heat loss certificate.

The mobile home manufacturer shall permanently affix the following "Certificate" to an interior surface of the home that is readily visible to the homeowner. The "Certificate" shall specify the following:

(a) *Heating zone certification.* The design zone at which the mobile home heat loss complies with § 1423.092(a).

(b) *Outdoor certification temperature.* The lowest outdoor temperature at which the installed heating equipment will maintain a 70° F temperature inside the home with or without storm sash and complying with §§ 1423.094 and 1423.095.

CERTIFICATE

Home manufacturer ____________________
Plant location ________________________
Home model _________________________

(Include zone map)

This mobile home has been thermally insulated to conform with the requirements of the Federal Mobile Home Construction and Safety Standards for all locations within climatic Zone ____.

Heating equipment manufacturer __________
Heating equipment model ______________

The above heating equipment has the capacity to maintain an average 70° F temperature in this home at outdoor temperatures of ____ ° F.

To maximize furnace economy and to conserve energy, it is recommended that the outdoor winter design temperature where this home is installed be not higher than ____ ° F.[1]

The above information has been calculated assuming a maximum wind velocity of 15 mi/h at standard atmospheric pressure.

§ 1423.097 Comfort cooling certificate and information.

(a) The mobile home manufacturer shall permanently affix a "Certificate" to an interior surface of the home that is readily visible to the home owner. This certificate may be combined with the heating certificate required in § 1423.096. The manufacturer shall comply with one of the following three alternatives in providing the certificate and additional information concerning the cooling of the mobile home:

(1) *Alternative 1.* If a central air conditioning system is provided by the home manufacturer, the heat gain calculation necessary to properly size the air conditioning equipment will be in accordance with the procedure outlined in Appendix ____ of this part or in accordance with procedures outlined in Chapter 22 of the ASHRAE Handbook of Fundamentals, with an assumed location and orientation. The following information shall be supplied on the Comfort Cooling Certificate:

Air conditioner manufacturer _____________
Air conditioner model __________________
Air Conditioning and Refrigeration Institute certified capacity ____ Btu/h.

The central air conditioning system provided with this home has been sized, assuming an orientation of the front (hitch) end of the home facing __________ and is designed on the basis of a 75° indoor temperature when outdoor temperatures are ____ ° F dry bulb and ____ ° F wet bulb.

Example Alternate 1

COMFORT COOLING CERTIFICATE

Mobile home manufacturer_______________
Plant location__________________________
Mobile home model______________________
Air conditioner manufacturer_____________
Air conditioner model___________________

Air Conditioning and Refrigeration Institute certified capacity ____ Btu/h.

The central air conditioning system provided with this home has been sized assuming an orientation of the front (hitch end) of the home facing _____ On this basis the system is designed to maintain an indoor temperature of 75° F when outdoor temperatures are ____° F dry bulb and ____° F wet bulb.

The temperature to which this home can be cooled will change depending upon the amount of exposure of the windows of this home to the sun's radiant heat. Therefore, the home's heat gains will vary dependent upon its orientation to the sun and any permanent shading provided. Information concerning the calculation of cooling loads at various locations, window exposures and shadings are provided in Chapter 22 of the 1972 edition of the ASHRAE Handbook of Fundamentals.

Information necessary to calculate cooling loads at various locations and orientations is provided in the special comfort cooling information provided with this mobile home.

(2) *Alternative 2.* For each home suitable for a central air cooling system, the manufacturer shall provide the following statement:

This home is suitable for the installation of a central air conditioning system.

Example Alternate 2

COMFORT COOLING CERTIFICATE

Mobile home manufacturer_______________
Plant location__________________________
Mobile home model______________________

This home is suitable for the installation of central air conditioning.

The supply air distribution system installed in his home is sized for Air Conditioning and Refrigeration Institute Certified Mobile Home Central Air Conditioning Systems of up to ____ Btu/h rated capacity when the air circulators of such air conditioners are rated at 0.3-inch water column static pressure or greater for the cooling air delivered to the mobile home supply air duct system.

Information necessary to calculate cooling loads at various locations and orientations is provided in the special comfort cooling information provided with this mobile home.

(3) *Alternative 3.* If the mobile home is not equipped with an air supply duct system, or if the manufacturer elects not to designate the home as being suitable for the installation of a central air condi-

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[1] The temperature to be specified shall be 20° F or 30 percent of the design temperature difference, whichever is greater, added to the temperature specified as the heating system capacity certification temperature without storm windows or insulating glass. Design temperature difference is 70 minus the heating system capacity certification temperature without storm windows or insulating glass, in degree Fahrenheit.

tioning system, the manufacturer shall provide the following statement:

> This home has not been produced in anticipation of its use with a central air conditioning system.

Example Alternate 3

COMFORT COOLING CERTIFICATE

Mobile home manufacturer________________
Plant location________________
Mobile Home Model________________

This home has not been produced in anticipation of its use with a central air conditioning system.

(b) For each home designated as suitable for central air conditioning and equipped with a supply air duct system, the manufacturer shall provide the maximum ARI certified central mobile home air conditioning capacity in accordance with Subpart E, § 1425.069(a) (3). If the capacity information provided is based on entrances to the air supply duct at other than the furnace plenum, the manufacturer shall indicate the correct supply air entrance and return air exist locations.

(c) *Comfort cooling information.* For each mobile home designated, either "suitable for" or "provided with" a central air conditioning system, the manufacturer shall provide comfort cooling information specific to the mobile home necessary to complete the cooling load calculations. The comfort cooling information shall include a statement to read as follows:

> In order to cool a home efficiently and economically, a cooling load (heat gain) calculation is required. The cooling load is dependent on the orientation, location and the structure of the home. Central air conditioners operate most efficiently and provide the greatest comfort when their capacity closely approximates the calculated cooling load. Each home's air conditioner should be sized in accordance with Chapter 22 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals, once the location and orientation are known.

INFORMATION PROVIDED BY THE MANUFACTURER NECESSARY TO CALCULATE SENSIBLE HEAT GAIN

Walls (without windows and doors) ________ "U" ________
Ceilings and roofs of light color ________ "U" ________
Ceilings and roofs of dark color ________ "U" ________
Floors ________ "U" ________
Air ducts in floor________ "U" ________
Air ducts in ceiling________ "U" ________
Air ducts installed outside the home________ "U" ________

Information necessary to calculate duct area ________________

§ 1423.098 Ventilation.

Mechanical ventilation which exhausts directly to the outside atmosphere from the living space of a home shall be equipped with an automatic or manual damper. Operating controls shall be provided such that mechanical ventilation can be separately operated without directly energizing other energy consuming devices.

§ 1423.100 Testing.

§ 1423.101 Structural load tests.

Every structural assembly tested shall be capable of meeting the Proof Load Test or the Proof Load Test and the Ultimate Load Test as follows:

(a) *Proof load tests.* Every structural assembly tested shall be capable of sustaining its dead load plus superimposed live loads equal to 1.75 times the required live loads for a period of 12 hours without failure. Failure shall be considered rupture, fracture, live load deflection of residual deflections measured 12 hours after live load removal which are greater than the limits set in § 1423.050(d). An assembly to be tested shall be of the minimum quality of materials and workmanship of the group of assemblies it represents. Each test assembly, component or subassembly shall be identified as to type and quality or grade of material. All assemblies, components or subassemblies qualifying under this section shall be subject to a continuing qualification testing program acceptable to the Department.

(b) *Ultimate load tests.* Every structural assembly tested shall be capable of sustaining its total dead load plus live loads increased by a factor of safety consistent with the material being tested. Assemblies to be tested shall be representative of average quality of materials and workmanship of the production. Factors of safety shall be based on nationally recognized standards and approved by the Department. Tests shall be conducted with loads applied in ¼ design live load increments at 10-minute intervals until 2 times live load plus dead load has been reached. Additional loading shall then be applied continuously until failure. Failures shall be considered rupture, fracture, or excessive yielding. All assemblies, components, or subassemblies qualifying under this section shall be subject to a periodic qualification testing program acceptable to the Department.

§ 1423.102 Test procedure for roof trusses.

(a) *Roof tests.* The following is an acceptable test procedure for roof trusses that are supported at the ends and support design loads. Where roof trusses act as supports for other members, act as cantilevers, or support concentrated loads, they shall be tested accordingly.

(b) *General.* Trusses may be tested in pairs or singly in a suitable test facility. When tested in pairs, they shall be spaced at the design spacing and shall be mounted on solid supports accurately positioned to give the required clear span distance (1) as specified in the design. The top and bottom chords may be braced and covered with the material, with connections or method of attachment, as specified by the completed mobile home. As an alternate test procedure, the top chord may be sheathed with ¼ inch by 24 inch by 12 inch plywood strips. Adjacent plywood strips must be separated by at least ⅛ inch. The plywood strip shall be nailed with 4d nails not closer than 8 inches on center along the top chord of one truss only. The bottom chords may be unbraced or covered with the material, with connections or methods of attachment, as specified for the completed mobile home. Truss deflections will be measured relative to a taut wire running over the support and weighted at the end to insure constant tension or other approved methods. Deflections will be measured at the two quarter points and at midspan. Loading shall be applied to the top chord through a suitable hydraulic system, masonry units, or weights to simulate design loads. Load units for uniformly distributed loads shall be separated so that arch action does not occur.

(c) *Nondestructive test procedure*—(1) *Dead load plus live load.* (i) Noting figure, measure and record initial elevation of the truss in test position at no load. (ii) Apply load units to the top chord of the truss equal to the full dead load of roof and ceiling. Measure and record deflections. (iii) Maintaining the dead load, add live load in approximate increments. Measure the deflections after each 10 pound per square foot increment. Apply incremental loads at a uniform rate such that approximately one-half hour is required to establish the total design load condition. Measure and record the deflections five minutes after loads have been applied. The maximum deflection due to design live load (deflection measured in step (iii) minus step (ii) 2) shall not exceed L/180, where L is a clear span measured in same units. (iv) Continue to load truss to dead load plus 1.75 times the design live load. Maintain this loading for 12 hours and inspect the truss for failure. (v) Remove the total superimposed live load. Trusses not recovering to at least the L/180 position within 12 hours shall be considered as failing.

(2) *Uplift Loads.* (i) Noting Figure measure and record initial elevation of the truss in an inverted test position at no load. Bottom chord of the truss shall be mounted in the horizontal position. (ii) Apply the uplift load as stated in § 1423.050(c) to the bottom chord of the truss. Measure and record the deflections 5 minutes after the load has been applied. (iii) Continue to load the truss to 1.75 times the design uplift load. Maintain this load for 3 hours and inspect the truss for failure. (iv) Remove applied loads and within three hours the truss must recover to at least L/180 position, where L is a clear span measured in the same units.

(3) *Destructive test procedure.* (i) Destructive tests shall be performed on three trusses to generally evaluate the truss design, no deflection reading will be required. (ii) Apply the load units to the

top chord of the truss with dead load plus 1.75 live load. Then apply live load in approximate ¼ design live load increments at 10 minute intervals or longer at the manufacturer's option until failure occurs. The truss shall be capable of sustaining dead load plus 2.5 times live load.

(4) Trusses qualifying under the nondestructive test procedure, Tests (1) and (2), shall be subject to a continuing qualification testing program acceptable to the Department. Trusses qualifying under the nondestructive and destructive test procedures, Tests (1), (2), and (3) shall be subject to periodic tests only.

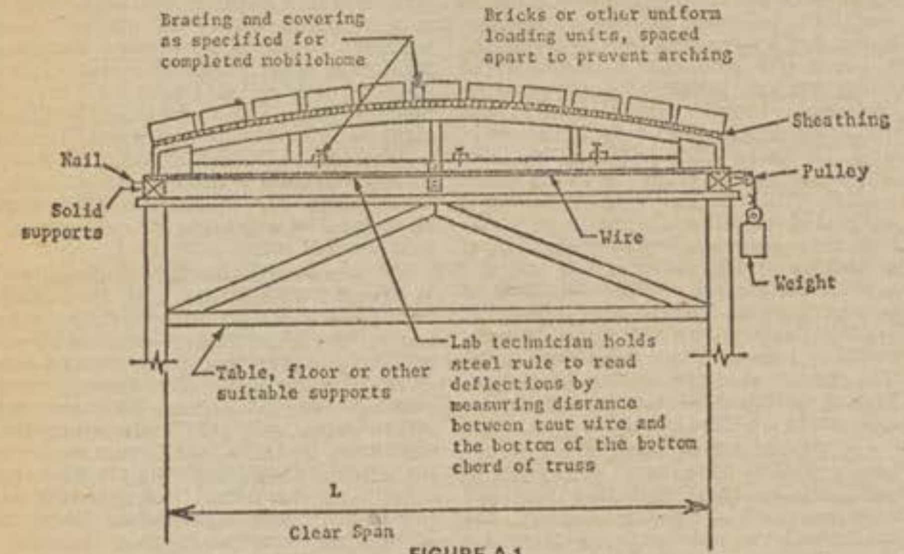

Bracing and covering as specified for completed mobilehome
Bricks or other uniform loading units, spaced apart to prevent arching
Sheathing
Nail
Pulley
Solid supports
Wire
Weight
Table, floor or other suitable supports
Lab technician holds steel rule to read deflections by measuring distance between taut wire and the bottom of the bottom chord of truss
L
Clear Span

FIGURE A-1

Test Procedure for Roof Trusses

§ 1423.103 Standard for windows used in mobile homes.

(a) *Scope.* These specifications set the minimum performance for all windows and sliding glass doors used in mobile homes except windows mounted in entry doors. Windows so mounted are components of the door and thus are excluded from this standard.

(b) *Materials and methods.* Any material or method of construction, whether or not provided for in this standard, and any material or method of questioned suitability, proposed for use in manufacture, shall nevertheless conform in performance as outlined in paragraph 3 of this standard and proof of capability of structural integrity shall be presented. If applicable, units shall comply with the following:

(1) *Wood and wood based products.* (i) Wood. Wood parts except for plywood and particleboard of the window units shall be manufactured of suitable lumber having a moisture content of 6 to 12 percent at the time of fabrication. Wood parts, except inside stops and trim shall be manufactured utilizing wet-use adhesive requirements as defined in ASTM D-3110 and preservative treated in accordance with NWMA IS-4. (ii) Plywood and particleboard. Plywood and particleboard parts except for inside stops and trim shall be manufactured utilizing wet-use adhesive requirements as defined in ASTM D-3110 and preservative treated in accordance with NWMA IS-4.

(2) *Aluminum*—(i) *Alloys.* Aluminum shall be of a commercial quality and of proper alloy for window construction, free from defects impairing strength and/or durability, as follows: Wrought aluminum alloys shall be those in which the alloying elements do not exceed the following maximum limits:

	Percent
Silicone	=7.0
Magnesium	
Manganese	=6.0
Chromium	
Iron	1.0
Copper	.4
Zinc	1.0
Total other	.5

BALANCE ALUMINUM

These limits apply to both bare products and to the core clad products. The cladding of clad products shall be within the same limits except that the maximum zinc limit may be 3.0 percent in order to assure that the cladding is anodic to the core. Where aluminum extrusions are used for the main frame and sash or ventilator sections, they shall have a minimum ultimate tensile strength of 22,000 psi and a yield of 16,000 psi. (ii) Finish. The exposed surface of all aluminum members shall be clean and free from serious surface blemishes. If exposed welded joints are used, they shall be dressed and finished.

(3) *Glass.* (i) Annealed glass installed in windows shall meet FS DD-G-451c. Sheet glass shall be not less than "B" quality. Plate and float glass shall be glazing quality. Glass shall be labeled to show name of manufacturer and quality, type and thickness. Glass louvers installed in jalousies shall be not less than 7/32'' thick nor longer than 36'', and exposed edges shall be seamed, ground or polished. (ii) Safety glazing materials, where used, shall meet ANSI Z97.1-1972. Tempered glass, where used, shall also meet FS DD-G-1403A. (iii) Insulated glass, when used, shall meet or exceed the requirements of Sealed Insulating Glass Manufacturers Association (SIGMA) unit shall be permanently identified with the name of the insulating glass manufacturer. (iv) Glass Tolerances and Areas. Glass shall meet or exceed the values shown in the Glass Table below. Tabulated areas may be increased as noted for use of tempered, heat strengthened or sealed insulating glass and shall be decreased as noted for use of sand-blasted, wire or laminated glass.

Glass dimensional tolerances [a] *and maximum allowable areas* [b]*—sheet glass*

Nominal thickness (inches)	Minimum thickness (inches)	Maximum area [b] (square feet) at 15 lb/ft²	Maximum area [b] (square feet) at 25 lb/ft²
SS	0.085	13	11
24 oz	.108	18	14
DS	.115	20	15
3/16	.182	40	30
7/32	.206	58	37
1/4	.236	72	43

[a] For other types of glass see Federal Specification DD-G-451c, dated Jan. 15, 1968.

[b] Maximum areas shown are based on minimum glass thicknesses set forth. Maximum areas shown apply for rectangular lites of annealed glass firmly supported on all 4 sides in a vertical position.

ADJUSTMENT FACTORS

RELATIVE RESISTANCE TO WIND LOADS [1]

Glass type:	*Approximate relationship*
Regular plate	1.0
Laminated	0.6
Wire	0.5
Heat strengthened	2.0
Fully tempered	4.0
Factory fabricated insulating glass [2]	1.5
Rough rolled or patterned surface	1.0
Sand blasted annealed glass	0.4

[1] To determine the maximum allowable area for the glass types listed multiply the allowable area established by the appropriate adjustment factor.

[2] Use thickness of thinner of the two lights, not thickness of unit.

(4) *Glazing.* Any method of glazing conforming to the Performance Requirements (Paragraph c) and Material and Methods Requirements (Paragraph b) shall be acceptable.

(5) *Hardware and Fasteners.* All hardware components and fasteners when considered as individual components, whether commercially available, or proprietary, must be capable of performing to the criteria stipulated in this section and in the Performance Requirements Section, Paragraph c of these specifications.

(c) *Performance requirements*—(1) *Size of test specimen.* All tests performed and all criteria herein are applicable to windows or sliding glass doors of the largest type that the producer desires to qualify under this specification. No interference of compliance to these requirements are to be made for products exceeding the size of the test specimen submitted. Largest unit size is determined in United inches, including one width plus one height. The performance of test units, selected in accordance with this paragraph, shall be applicable to production units of that series if operating sash width and height dimensions of production units are equal to or less than corresponding dimensions in that unit tested and passed.

(2) *Structural performance test*—(i) *Standard wind*. There shall be no glass breakage, permanent deflection or any other condition which would cause the specimen to be inoperable after being subjected to an exterior pressure, 15 pounds per square foot. The test method applicable to this requirement shall be ASTM E-330. (ii) *Windstorm resistive*. There shall be no glass breakage, permanent deflection or any other condition which would cause the specimen to be inoperable after being subjected to exterior pressure of 25 pounds per square foot. The test method applicable to this requirement shall be ASTM E-330.

(3) *Air infiltration test*. Air infiltration shall not exceed 0.50 CFM per square foot of window area when tested in accordance with ASTM E-283 at an exterior pressure differential of 1.567 pounds per square foot (0.30'' of water pressure).

(4) *Water resistance test*. No leakage shall pass the interior face of the test specimen at a test pressure of 2.86 psf (0.55'' water pressure) when tested in accordance with ASTM E-331 except that the test period shall consist of four cycles, each cycle consisting of five minutes with pressure applied and one minute with pressure released, during which the water spray will be continuously applied. (i) For the purpose of compliance with paragraph (c)(4) of this section, all units which may have exterior screens, shall be tested first with screens in place and thereafter with screens removed. (ii) For the purpose of compliance with paragraph (c)(4) of this section penetration, as referenced in part 14, ASTM E-331-70, page 658, paragraph 4.3, shall not include drops passing the interior face by energy developed in the bursting of sill drain system bubbles created by a pressure differential applied to the exterior face of the specimen.

(d) *Test sequence*. The sequence of tests shall be performed as they are listed above except that Structural Performance Test to Standard Wind (15 PSF) exterior pressure may be followed by Standard Wind interior pressure (7.5 PSF), which may be followed by the Air Infiltration Test, which may be followed by the Water Resistance Test, which may be followed by the Structural Performance Test to Hurricane and Windstorm Resistance Wind (25 PSF) exterior pressure, which may be followed by the Hurricane and Windstorm Resistance interior pressures (12.5 PSF), which may be followed by the Air Infiltration Test, which may be followed by the Water Resistance Test. The Air Infiltration Test may be performed after the Water Resistance Test providing all sealed areas are thoroughly dried.

(e) *Screens*. (1) Screen shall be provided with fastening devices, suited particularly for application to the specific window for which it is intended, and sufficient strength to perform satisfactorily.

(2) Insect screening shall be of a material compatible with aluminum and shall meet CS 138-55, "Insect Wire Screening," FS RR-W-365, "Screening, Wire, Insect," CS 248-64, "Vinyl Coated Glass Fibre Insect Screening and Louver Cloth," or FS L-S-125a "Screening, Non Metallic Insect."

(f) *Workmanship—Assembly*. Windows shall be assembled in a secure and workmanlike manner to perform as hereinafter specified and to assure neat and weather tight construction. A permanent watertight joint shall be made at the junction of the sill and side frame members.

(g) *Shipping*. Units may be shipped either as a subassembly unit or as a completely assembled unit but not as a KD or open unit. A KD unit is a unit that is complete in its entirety with the exception of glass, glazing material, or screen, which is shipped in a disassembled condition and later assembled and glazed according to the instructions of the manufacturer and utilizing all of the components supplied or specified by the manufacturer. An open unit is a unit that is complete in its entirety with the exception of glass, glazing materials, or screen, which is shipped in an assembled condition and later glazed according to the instructions of the manufacturer, utilizing all of the components supplied by the manufacturer.

A sub-assembly unit is a unit that is complete in its entirety including the glazing of glass or other glazing panels into their respective fixed or moving sash frames, which is shipped with such glazed panels separate from each other or from any master frame, which master frame may be either disassembled or assembled. The connection of such master frame to glazed, fixed, or moving panels is to take place later according to the instructions of the manufacturer utilizing all of the components supplied by the manufacturer. A completely assembled unit is one that is complete in its entirety and is shipped with all parts and sub-assemblies in complete connection with each other and no separate pieces.

(h) *Permanent identification*. (1) As a minimum identification requirement, each unit shall bear a permanent certification label containing a code number traceable to the manufacturer through the certifying agency or the name of the manufacturer or brand name together with the city-and-state location of the manufacturer or main office of the manufacturer.

(2) Identification shall be of a type designed to discourage easy removal, shall be legible and shall remain legible under normal operating conditions for a period of not less than five years from date of product installation.

(3) Location of identification shall be such that it is accessible for normal direct viewing purposes from the interior side of the product, after the unit is installed, without the necessity of product disassembly. Identification located only on the glass or screen shall not be acceptable.

(4) Acceptable means of identification are, but are not limited to, the following: Embossed, stamped, cast or molded characters becoming an integral part of the material on which they are located; flexible color-fast and durable labels, decals, stickers, etc., affixed with a permanent-type adhesive; or rigid metal or plastic name plates affixed mechanically or with a permanent-type adhesive.

(i) *Certification*. The manufacturer shall show evidence of continued compliance by affixing a quality certification label to the product in accordance with ANSI Z34.1, "American National Standard Practice for Certification Procedures."

§ 1423.104 Standard for egress windows for use in mobile homes.

(a) *Scope and purpose*. The purpose of these requirements is to ensure that the windows are designed, constructed, and installed so as to provide an exit which can be easily used in the emergency conditions encountered in a fire or similar disaster.

(b) *Requirements*.—(1) *Installation*. Window manufacturers shall provide the home manufacturer with written installation instructions.

(2) *Performance*. The egress window including auxiliary frame and seals, if any, shall meet the requirements of the latest "Window Specification for Utilization in Mobile Homes" (§ 1423.103).

(3) *Dimensions*. (i) All egress windows shall have a minimum clear dimension of 22 inches when determined in accordance with Test A paragraph (d)(1) of this section. (ii) All egress windows shall have a minimum clear opening of 5 square feet when determined in accordance with Test B, paragraph (d)(2) of this section.

(4) *Operational*. (i) Operating constructions shall be applied to each egress window and carry the legend "It is recommended that the instructions shall not be removed." (ii) The number of locks and latches shall not exceed 2, not including the 4 appurtenance attachment mechanisms permitted by paragraph (c)(2)(i) of this section. (iii) Locks, latches, lifting and sliding operational forces shall not exceed a force of 20 pounds when tested in accordance with Test C, paragraph (d)(3) of this section. (iv) Any handle or latch required to operate the emergency egress provisions of the window shall be attached in the factory by either a permanent method or a mechanical method which requires a tool not commonly available in the home, unless removal of the latch or handle will in no way limit the effectiveness of the egress provision. (v) Any window whose egress provisions are dependent on the operation of a operator is unacceptable.

Example. Awning windows utilizing a single vent for egress and requiring a rotary operator for activation is unacceptable, whereas an awning window set in a separate frame whose activation requires only a 180° twist of the lock to allow egress is acceptable even though a rotary operator is present for normal operation.

(c) *Appurtenances.* (1) The addition or inclusion of screens, storm windows, or other appurtenances shall not encroach upon the dimensional requirements set forth in paragraph (b)(3) of this section.

(2) Any mechanism used to attach an appurtenance such as a screen or storm window to the window shall meet the following requirements unless the appurtenance meets the requirements of paragraph (c)(3) of this section. (i) The number of mechanisms shall not exceed 4; and (ii) the operating force of the mechanisms shall not exceed 5 pounds tested in accordance with Test D paragraph (d)(4) of this section and (iii) The mechanisms shall be designed so that that cannot be misapplied utilizing normal household tools such as screwdrivers, pliers and wrenches exceeding the aforementioned forces; and (iv) The surface to which the operating force is applied shall have a minimum cross-sectional area of 0.25 square inches.

(3) If an appurtenance such as a screen or storm window is attached to the window in such a manner that it need not be removed or disingaged in any way in order to effect a fully opened exit, the requirements of paragraph (c)(2) of this section need not be met.

(4) The operating instructions detailed in paragraph (b)(4)(i) of this section shall include instructions on the required removal and replacement of any screen and/or storm sash appurtenance.

(d) *Test Methods*—(1) *Test Method A—Minimum Dimensions.* The minimum dimension of 22 in. required by paragraph (b)(3)(i) of this section shall be tested as follows: When the window is in the final position for egress, a 22 in. dowel shall be passed through the opening at the point of its least dimension while contacting only one point of the window frame, at either the horizonal or vertical orientation of the dowel.

(i) *Example.* In a horizontally opening window (sliding or rolling), the minimum dimension requirement may be met as follows: When the window is in the final position for egress, place one end of the dowel perpendicularly against the portion of the main frame side (bottom) projecting furtherest toward the center of the opening, and pass the dowel through the opening in a horizontal (vertical) plane without touching any portion of the device except the main frame side (bottom) on which it is pivoted. (ii) *Example.* Any type of window may be mounted in a side, bottom, or top hinged or pop-out egress frame which in the fully opened position meets the minimum dimension and area requirements.

(2) *Test Method B—Minimum Area.* The minimum area requirement of 5 square feet contained in paragraph (b)(3)(ii) of this section shall be determined by multiplying the minimum dimension (which may exceed 22 in.) by the clear dimension measured perpendicularly to the minimum dimension and in the plane of the window main frame.

(i) *Example.* In a vertically operating window whose minimum dimension is from the main frame bottom to that portion of the operating vent projecting furtherest toward the horizontal center line of the egress opening when in the fully opened position, the minimum area shall be determined by multiplying the minimum dimension by the inside side-to-side dimension.

(3) *Test Method C—Operating Forces.* (i) For horizontal or vertical moving windows, a force gage shall be attached to the manual pull bar at its centerpoint. After opening the latch or lock, a force not to exceed 20 pounds shall be exerted in a direct pull parallel to the window in order to obtain movement in the opening direction. The window shall be in the closed and latched position prior to the test and shall have been subjected to 5 opening and closing cycles prior to the test. (ii) Locks and latches shall be tested as noted in paragraph (d)(3)(i) of this section except that the force gage shall be located in the center of the latch or lock handle.

(4) *Test Method D—Mechanical Device Operating Force (Appurtenances).* (i) A force gage of sufficient capacity using a point contact and having the ability to retain the maximum reading (Chatillion DPP-50 or similar) shall be used. The force gage point shall be applied to the mechanism at the center of the normal force application area and sufficient force applied to disengage the appurtenance. The maximum reading shall be retained by the force gage and may be read directly.

(e) *Test Report.* (1) The test report shall include all requirements of the specification listed in their order shown in this specification. Where certain provisions of the specification do not apply, the notation "N.A." (Not applicable) shall so denote these items. Where certain appurtenances are not supplied; such as storm windows or screen, the notation "N.S." (Not supplied) shall so denote those items.

(2) The test report shall be complete with manufacturers assembly drawing, extrusion drawings, parts list, weatherstrip description, glazing method, description including backbedding and glazing method, installation and operating instructions. Where the unit tested is not in its actual installation, a clause stating the following shall be included test report "This unit tested as submitted. Actual installation must be in accordance with the instructions included with this report or this report is not valid."

(3) The test report on all units submitted for test not having appurtenances listed in paragraph (c) of this section shall include a statement as follows "This unit tested without storm windows (or screen). The installation of these items with this product invalidates this test report."

(4) For any test on component parts, such as balances, friction positioners, etc., certification by an independent testing agency shall be acceptable for evidence of compliance. If such certification is used, the test report shall so state, and give the name of the agency.

(5) Test reports used to demonstrate compliance with this standard to any governmental body shall be made available to the public upon request.

§ 1423.105 Standard for swinging exterior passage doors for use in mobile homes.

(a) *Introduction.* The standard applies to all exterior passage door units, excluding sliding doors and doors used for access to utilities and compartments. This standard applies only to the door frame consisting of jambs, head and sill and the attached door or doors.

(b) *Purpose.* It is the purpose of this standard to establish minimum performance levels for exterior passage door units irrespective of the type of material used in the manufacture of these products.

(c) *General requirements and materials of construction.* (1) The design and construction of the exterior passage door units shall conform with the provisions of this standard. Requirements for any size, weight, or quality of material modified by the terms of "minimum", "not less than", "at least," and similar expressions are minimum standards. The manufacturer may exceed these standards provided such deviation does not result in an inferior product or defeat the purpose and intent of this standard. Units may be shipped as a completely assembled unit, but not as KD or open unit. A KD unit is a unit that is complete in its entirety, which is shipped in a disassembled condition and later assembled and glazed according to the instructions of the manufacturer. An open unit is a unit that is complete in its entirety with the exception of a window insert, which is shipped in an assembled condition and later glazed according to the instructions of the manufacturer. A completely assembled unit is one that is complete in its entirely and is shipped with all parts and subassemblies in complete connection with each other and no separate pieces, except for: lock-knobs only and keys, door chain and attachments, storm door latch, chain and attachments, threshold extension, screw cover, drip cap.

(2) Workmanship. All construction methods and workmanship shall be in conformance with accepted engineering practices to insure durable, livable, and safe housing. Materials, existing or new, shall be such as to provide durable, livable safe housing.

(d) *Materials and methods.* Any material or method of construction, whether or not provided for in this standard, and any material or method of questioned suitability, proposed for use in manufacture, shall nevertheless conform in performance as outlined in paragraph (e) of this standard and proof of capability of structural integrity shall be presented. If applicable, units shall comply with the following:

(1) *Wood and Wood Based Products*—(i) *Wood.* Wood door frame parts shall be manufactured of suitable lumber having a moisture content of 6 to 12 percent at time of fabrication. Wood parts except interior trim shall be manufactured utilizing wet-use adhesive requirements

as defined in ASTM D-3110 and Preservative Treated in accordance with NWMA IS-4 standard. Doors shall conform to the Type 1 requirements of NWMA IS 1-73, NWMA IS 5-73 or FHDA 4-72. (ii) *Plywood.* Plywood shall be manufactured utilizing wet-use adhesive requirements as defined in ASTM D-3110 and Preservative Treated in accordance with NWMA IS-4 standard. (iii) *Fiber Board.* Fiber board parts shall be manufactured utilizing adhesives meeting the performance requirements set forth in ASTM D-3110 for wet-use adhesives and preservative treated in accordance with NWMA IS-4 "Water-Repellent Preservative Non-Pressure Treatment for Millwork." (iv) Hardboard parts shall meet or exceed the requirements for ⅛ inch tempered hardboard in accordance with the latest edition of PS 58.

(2) *Hardware and fastener.* All hardware components and fasteners when considered as individual components, whether commercially available, or proprietary, must be capable of performing to the criteria stipulated in this section and in the Performance Requirements Section, paragraph (e) of these specifications.

(3) *Glass.* Glass used in doors shall be not less than g6 or "B" quality according to the Federal Specification DD-G-451. For glass 3 feet 6 inches above the floor ordinary (annealed) glass may be used. The minimum thickness shall be single strength (0.085 in.). When the least dimension of a pane exceeds 15 in., double strength (0.115 in.) glass shall be used. When pane area exceeds 6 square feet 3/16 inches (0.182 in.) minimum thickness shall be used. Glass in jalousies shall be at least 7/32 in. in thickness and not longer than 36 in. Exposed edges shall be seamed, ground or polished to prevent injury. Glazing which is less than 3 ft. 6 in. above the floor shall be safety glazing material meeting ANSI Z97.1.

(4) *Weatherstripping.* A tight threshold and weatherstripping to reduce air infiltration and improve water resistance shall be provided capable or performing to the criteria stipulated in the Performance Requirements Section, paragraph (e) of this standard.

(e) *Performance Requirements.*—(1) *Size of Test Specimen.* All tests shall be performed on exterior passage door units with all operable portions closed and all criteria herein are applicable to exterior passage doors of the largest type that the producer desires to qualify under this specification. No inference of compliance to these requirements is to be made for products exceeding the size of the test specimen submitted. Largest unit size is determined by the maximum width and height dimensions of production units that are equal to or less than corresponding dimensions in that unit tested and passed.

(2) *Structural performance test*—(i) *Wind pressure resistivity.* There shall be no glass breakage or permanent deflection or any other condition which would cause the specimen to be inoperable after being subjected to exterior pressures of 25 pounds per square foot. The test method applicable to this requirement shall be ASTM E-330. (ii) *Interior pressure.* There shall be no glass breakage or permanent deflection or any other condition which would cause the specimen to be inoperable after being subjected to an interior pressure equal to ½ the requirements in paragraph (e) (2) (i) of this section. The test method applicable to this requirement shall be ASTM E-330 except that no artificial means of containing pressure shall be allowed. Should pressure not be obtainable due to lack of air, the testing agency will report the pressure achieved, theoretical air flow supplied to the unit, and certify that no additional flow was available. Laboratory equipment used for this test must be capable of developing 10 x air flow determined in paragraph (e) (2) (iii) of this specification. (iii) *Air infiltration test.* Air infiltration shall not exceed the limites set forth below when tested in accordance with ASTM E-283 at an exterior pressure differential of 1.56 pounds per square foot (0.300" water pressure).

1.35 ft.^{3}/min./ft.^{2} of door	Jan. 1, 1975.
1.2 ft.^{3}/min./ft.^{2} of door	Jan. 1, 1976.
1.0 ft.^{3}/min./ft.^{2} of door	Jan. 1, 1977.

(iv) *Water resistance test.* No water shall pass the interior face of the test specimen at a test pressure of 0 psf when tested in accordance with ASTM E-331. (v) The sequence of tests shall be performed as they are listed above. The Air Infiltration Test may be performed after the Water Resistance Test providing all sealed areas are thoroughly dried.

Subpart E—Plumbing Systems

§ 1424.010 Scope.

This Subpart E of this Standard covers the plumbing materials, fixtures, and equipment installed within or on mobile homes. It is the intent of this subpart to assure plumbing systems supplied with water in sufficient volume and at adequate pressure which permits satisfactory functioning without undue noise under all conditions of normal use.

§ 1424.020 Definitions.

(a) The following definitions are applicable to § 1424.000 only:

(1) "Air Gap (Water Distribution System)" means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, water supplied appliances, or other device and the flood level rim of the receptacle.

(2) "Anti-Siphon Trap Vent Device" means a device which automatically opens to admit air to a fixture drain above the connection of the trap arm so as to prevent siphonage, and closes tightly when the pressure within the drainage system is equal to or greater than the atmospheric pressure so as to prevent the escape of gases from the drainage system into the mobile home.

(3) "Backflow" means the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended sources.

(4) "Backflow Connection" means any arrangement whereby backflow can occur.

(5) "Backflow Preventer" means a device or means to prevent backflow.

(6) "Branch" means any part of the piping system other than a riser, main or stack.

(7) "Common Vent" means a vent connecting at the junction of fixture drains and serving as a vent for more than one fixture.

(8) "Continuous Vent" means a vertical vent that is a continuation of the drain to which it connects.

(9) "Continuous Waste" means a drain from two or more fixtures connected to a single trap.

(10) "Critical Level" means a point established by the testing laboratory (usually stamped on the device by the manufacturer) which determines the minimum elevation above the flood level rim of the fixture or receptacle served on which the device may be installed. When a backflow prevention device does not bear a critical level marking, the bottom of the vacuum breaker, combination valve, or of any of such approved or listed device shall constitute the critical level.

(11) "Cross Connection" means any physical connection or arrangement between two otherwise separate systems or sources, one of which contains potable water and the other either water, steam, gas or chemical of unknown or questionable safety whereby there may be a flow from one system or source to the other, the direction of flow depending on the pressure differential between the two systems.

(12) "Developed Length" means that length of pipe measured along the center line of the pipe and fittings.

(13) "Diameter," unless otherwise specifically stated, means the nominal (inside) diameter designated commercially.

(14) "Drain" means a pipe that carries waste, water, or water-borne wastes in a drainage system.

(15) "Drain Connector" means the removable extension, consisting of all pipes, fittings and appurtenances, from the drain outlet to the drain inlet serving the mobile home.

(16) "Drain Outlet" means the lowest end of the main or secondary drain to which a sewer connection is made.

(17) "Drainage System" means all piping within or attached to the structure that conveys sewage or other liquid waste to the drain outlet, not including the drain connector.

(18) "Fixture Drain" means the drain from the trap of a fixture to the junction of that drain with any other drain pipe.

(19) "Fixture Supply" means the water supply pipe connecting a fixture to a branch water supply pipe or directly to a main water supply pipe.

(20) "Flood-Level" means the level in the receptacle over which water would overflow to the outside of the receptacle.

(21) "Flooded" means the condition which results when the liquid in a con-

tainer or receptacle rises to the flood-level.

(22) "Flush Tank" means that portion of a toilet that is designed to contain sufficient water to adequately flush the fixture.

(23) "Flush Valve" means a device located at the bottom of a flush tank for flushing a toilet.

(24) "Flushometer Valve" means a device which discharges a predetermined quantity of water to a fixture for flushing purposes and is closed by direct water pressure.

(25) "Grade" means the fall (slope) of a pipe in reference to a horizontal plane expressed in inches per foot length.

(26) "Horizontal Branch" means any pipe extending laterally, which receives the discharge from one or more fixture drains and connects to the main drain.

(27) "Horizontal Pipe" means any pipe or fitting which makes an angle of more than 45 degrees with the vertical.

(28) "Individual Vent" means a pipe installed to vent a fixture drain.

(29) "Inlet Coupling" means the terminal end of the water system to which the water service connection is attached. It may be a swivel fitting or threaded pipe end.

(30) "Main" means the principal artery of the system to which branches may be connected.

(31) "Main Drain" means the lowest pipe of a drainage system which receives sewage from all the fixtures within a mobile home and conducts these wastes to the drain outlet.

(32) "Main Vent" means the principal artery of the venting system to which vent branches may be connected.

(33) "Offset" means a combination of pipe and/or fittings that brings one section of the pipe out of line but into a line parallel with the other section.

(34) "Pitch." See Grade.

(35) "Plumbing Fixtures" means receptacles, devices, or appliances which are supplied with water or which receive liquid or liquid-borne wastes for discharge into the drainage system.

(36) "Plumbing System" means the water supply and distribution pipes; plumbing fixtures, faucets and traps; soil, waste and vent pipes; and water-treating or water-using equipment.

(37) "Primary Vent." See Main Vent.

(38) "Relief Vent" means an auxiliary vent which permits additional circulation of air in or between drainage and vent systems.

(39) "Secondary Vent" means any vent other than the main vent or those serving each toilet.

(40) "Sewage" means any liquid waste containing animal or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

(41) "Siphonage" means the loss of water seal from fixture traps resulting from partial vacuum in the drainage system which may be of either of the following two types, or a combination of the two: (i) Self-siphonage resulting from vacuum in a fixture drain generated solely by the discharge of the fixture served by that drain, or, (ii) Induced siphonage resulting from vacuum in the drainage system generated by the discharge of one or more fixtures other than the one under observation.

(42) "Trap" means a fitting or device designed and constructed to provide a liquid seal that will prevent the back passage of air without materially affecting the flow of liquid waste through it.

(43) "Trap Arm" means the portion of a fixture drain between a trap and its vent.

(44) "Trap Seal" means the vertical depth of liquid that a trap will retain.

(45) "Vacuum Breaker." See Backflow Preventer.

(46) "Vent Cap" means the device or fitting which protects the vent pipe from foreign substance with an opening to the atmosphere equal to the area of the vent it serves.

(47) "Vent System" means that part of a piping installation which provides circulation of air within a drainage system.

(48) "Vertical Pipe" means any pipe or fitting which makes an angle of 45 degrees or less with the vertical.

(49) "Water Connection" means the fitting or point of connection for the mobile home water distribution system designed for connection to a water supply.

(50) "Water Connector" means the removable extension connecting the mobile home water distribution system to the water supply.

(51) "Water Distribution System" means potable water piping within or permanently attached to the mobile home.

(52) "Wet Vent" means a vent which also serves as a drain for one or more fixtures.

(53) "Wet Vented Drainage System" means the specially designed system of drain piping that also vents one or more plumbing fixtures by means of a common waste and vent pipe.

§ 1424.030 General requirements.

(a) *Minimum requirements.* Any plumbing system installed in a mobile home shall conform, at least, with the provisions of this subpart.

(1) *General.* The plumbing system shall be of durable material, free from defective workmanship, and so designed and constructed as to give satisfactory service for a reasonable life expectancy.

(2) *Conservation.* Water closets shall be selected and adjusted to use the minimum quantity of water consistent with proper performance and cleaning.

(3) *Connection to Drainage System.* All plumbing, fixtures, drains, appurtenances, and appliances designed or used to receive or discharge liquid waste or sewage shall be connected to the mobile home drainage system in a manner provided by this standard.

(4) *Workmanship.* All design, construction, and workmanship shall be in conformance with accepted engineering practices and shall be of such character as to secure the results sought to be obtained by this standard.

(5) *Components.* Plumbing materials, devices, fixtures, fittings, equipment, appliances, and accessories intended for use in or attached to a mobile home shall be listed or certified by an approved listing agency, or be specifically approved by the Department when listing by an approved listing agency is not available.

(6) *Prohibited Fittings and Practices.* (i) Drainage or vent piping shall not be drilled and tapped for the purpose of making connections. (ii) Except as specifically provided elsewhere in this standard, vent pipes shall not be used as waste or drain pipes. (iii) Fittings, connections, devices, or methods of installation that obstruct or retard the flow of sewage, or air in the drainage or venting systems in an amount greater than the normal frictional resistance to flow shall not be used unless their use is acceptable in this standard or their use is accepted as having a desirable and acceptable function of ultimate benefit to the proper and continued functioning of the plumbing system. (iv) Cracks, holes, or other imperfections in materials shall not be concealed by welding, brazing, or soldering or by paint, wax, tar, or other leak-sealing or repairing agents. (v) Piping, fixtures or equipment shall be located so as not to interference with the normal use or with the normal operation and use of windows, doors or other required facilities. (vi) Galvanzed pipe shall not be bent or welded.

(7) *Alignment of Fittings.* All valves, pipes, and fittings shall be installed in correct relationship to the direction of flow.

(b) *Protective requirements*—(1) *Cutting Structural Members.* Structural members shall not be unnecessarily or carelessly weakened by cutting or notching.

(2) *Exposed Piping.* All piping, pipe threads, hangers, and supports exposed to the weather, water, mud, and road hazard, and subject to damage therefrom, shall be painted, coated, wrapped, or otherwise protected from deterioration.

(3) *Road Damage.* Pipes, supports, drains, outlets, or drain hoses shall not extend or protrude in a manner where they could be unduly subjected to damage during transit.

(4) *Freezing.* All piping and fixtures subject to freezing temperatures shall be insulated or protected to prevent freezing, under normal occupancy. All piping shall be designed to allow complete gravity drainage.

(5) *Rodent Resistance.* All exterior openings around piping and equipment shall be sealed to resist the entrance of rodents.

(6) Piping and electrical wiring shall not pass through the same holes in walls, floors or roofs. Plastic piping shall not be exposed to excessive heat or radiation from open flame appliances.

§ 1424.040 Materials.

(a) *Minimum Standards.* Materials, fixtures, or devices used for entering into the construction of plumbing systems in any mobile home shall be free from defects and shall conform to approved standards or to applicable standards in the following Table: (See § 1420.040)

(b) *Specific Usage.* Each of the sections following the Table indicates specifically the type of material presently permitted for use in the various parts of the plumbing system.

Materials	ANSI	ASTM	FS	Other standards
Ferrous pipe and fittings				
Cast iron screwed fittings	B16.4—1971			
Malleable iron screwed fittings	B16.3—1971			
Special cast iron fittings				IAPMO PS 5—1966
Welded wrought iron pipe	B36.2—1969	A72—1968		
Wrought steel and wrought iron pipe	B36.10—1970			
Black and hot dipped zinc-coated (galvanized) welded and seamless steel pipe.		A120—1972a		
Welded and seamless steel pipe	B125.1—1972	A53—1972a		
Pipe threads (except dry-seal)	B2.1—1968			
Cast iron soil piping and fittings	A112.5.1—1971	A74—1972	WW-P-401D—1969	
Nonferrous pipe and fittings				
Seamless copper, pipe, standard sizes	H26.1—1973	B42—1972		
Wrought seamless copper and copper alloy tube	H23.4—1973	B251—1971		
Seamless copper water tube	H23.1—1973	B88—1972		
Copper drainage tube (DWV)	H23.6—1973	B306—1973		
Wrought copper and bronze solder-joint pressure fittings	B16.22—1973			
Wrought copper and wrought copper alloy solder-joint drainage fittings.	B16.29—1966			
Cast brass solder-joint pressure fittings	B16.18—1972			
Cast bronze solder-joint drainage fittings—DWV	B16.23—1969			
Cast bronze fittings for flared copper tubes	B16.26—1967			
Seamless red brass pipe, standard sizes	H27.1—1973	B43—1972		
Cast bronze threaded fittings, 150 and 300 pound	B16.15—1971.			
Plastic pipe and fittings, ABS plastic drain, waste, and vent pipe and fittings.		D2661—1973.	L-P 322B—1973.	IAPMO PS 17-71 NSF 14—1970
PVC plastic drain, waste, and vent pipe and fittings		D2665—1973.	L-P-320B—1973.	IAPMO PS 27-69 NSF-14—1970
Chlorinated poly (vinyl/chloride) (CPVC) plastic hot water distribution systems.		D2846—1973.		NSF-14—1970
Polybutylene (PB) plastic pipe (SDR-PR)		D2662—1973.		
Polybutylene (PB) plastic hot water distribution systems		D3309—1974.		
Miscellaneous pipe nipples, treaded			WW-N-351B(I)—1970.	
Rubber gaskets for cast iron soil pipe fittings		C564—1970.		
Backflow prevention devices	A112.14.1—1975.			IAPMO PS 31—1971
Valve, bronze, gate 125—150 and 200 pound			WW-V 54D—1973.	
Valve, cast iron gate, threaded and flanged			WW-V-58B—1971.	
Plumbing—fixture-setting compound			HH-C-536A—1954.	
Cast brass and tubing P-traps				IAPMO PS 2—1966
Relief valves and automatic gas shutoff devices for hot water supply systems.	Z21.22 [1]—1971.			
Solvent cement for ABS plastic pipe and fittings		D2235—1973		NSF-14—1970
Solvent cement for PVC plastic pipe and fittings		D2564—1973		NSF-14—1970
Anti-siphon trap vent device (*reserved*) diversion tees and twin waste elbow.				IAPMO PS 9—1966
Flexible copper water connectors				IAPMO PS 14—1971
Dishwater drain airgaps				IAPMO PS 23—1968
Coated flexible metal gas connectors for exterior use				IAPMO TSC 9—1972
Plumbing fixtures				
Plumbing fixtures for land use			WW-P 541D—1971	
Vitreous china plumbing fixtures	A112.19.2—1973			NSF-24—1970
Enameled cast iron plumbing	A112.19.1—1973			
Porcelain enameled formed steel plumbing fixtures				IAPMO TSC 22—1972
Formed metal porcelain-enameled sanitaryware				IAPMO PS 5—1967
Plastic bathtub units	Z124.1—1974			NSF-24—1972
Gel-coated glass-fiber reinforced polyester resin shower receptor and shower stall units.	A124.2—1967			NSF-24—1972
Stainless steel plumbing fixtures—residential use				CS-243—1962 NSF-24—1972
Drains for prefabricated and precast showers				IAMPO PS 4—1966 NSF-24—1972
Cultured marble lavatory				IAMPO PS 18—1972
Prefabricated shower receptors, shower enclosures and nonmetallic bathtubs.				IAPMO PS 11—1972
Performance specifications and methods of test for safety glazing material used in buildings.	Z97.1—1972			NSF-24—72

[1] With addenda.

§ 1424.050 Joints and connections.

(a) *Tighteness.* Joints and connections in the plumbing system shall be gastight and watertight for the pressures required under testing procedures.

(1) *Assembling of Pipe.* All joints and connections shall be correctly assembled for tightness. Pipe threads shall be fully engaged with the threads of the fitting. Plastic pipe and copper tubing shall be inserted to the full depth of the solder cup or welding sockets of each fitting. Pipe threads and slip joints shall not be wrapped with string, paper, putty, or similar fillers.

(2) *Threaded Joints.* Threads for screw pipe and fittings shall conform to the approved or listed standard. Pipe ends shall be reamed out to size of bore. All burrs, chips, cutting oil and foreign matter shall be removed. Pipe joint cement or thread lubricant shall be of approved type and applied to male threads only.

(3) *Solder Joints.* Solder joints for tubing shall be made with approved or listed solder type fittings. Surfaces to be soldered shall be cleaned bright. The joints shall be properly fluxed with noncorrosive paste type flux and made with approved or listed 50-50 solder or an approved solder having a higher melting temperature.

(4) *Plastic Pipe, Fittings and Joints.* Plastic pipe and fittings shall be joined by installation methods recommended by the manufacturer or by a recognized, approved, or listed standard.

(5) Union Joints. Metal unions shall have metal-to-metal ground seats.

(6) *Flared Joints.* Flared joints for soft-copper water tubing shall be made with listed fittings. The tubing shall be expanded with a proper flaring tool.

(7) *Cast Iron Soil Pipe Joints.* Approved or listed cast iron pipe may be joined as follows: (i) Approved or listed hubless pipe as per the manufacturer's recommendation. (ii) Hub and plain-end soil pipe may be joined by compression fittings per the manufacturer's recommendation.

§ 1424.060 Traps and cleanouts.

(a) *Traps*—(1) *Traps required.* Each plumbing fixture, except listed toilets, shall be separately trapped by approved water seal "P" traps. All traps shall be effectively vented.

(2) *Dual Fixtures.* A two-compartment sink, two single sinks, two lavatories, or a single sink and a single lavatory with waste outlets not more than 30 inches apart and in the same room and flood level rims at the same level may be connected to one "P" trap and may be considered as a single fixture for the purpose of drainage and vent requirements.

(3) *Prohibited Traps.* A trap which depends for its seal upon concealed interior partitions shall not be used. Full "S" traps, bell traps, drum traps, crown-vented traps, and running traps are prohibited. Fixtures shall not be double-trapped.

(4) *Material and Design.* Each trap shall be self-cleaning with a smooth and uniform interior waterway. Traps shall be manufactured of cast iron, cast brass, or drawn brass tubing of not less than

No. 20 Brown and Sharpe gage, or approved or listed plastic, or other approved or listed material. Union joints for a trap shall be beaded to provide a shoulder for the union nut. Each trap shall have the manufacturer's name stamped or cast in the body of the trap, and each tubing trap shall show the gage of the tubing.

(5) *Trap Seal*. Each "P" trap shall have a water seal of not less than 2 inches and not more than 4 inches and shall be set true to its seal.

(6) *Size*. Traps shall be not less than 1¼ inches in diameter. A trap shall not be larger than the waste pipe to which it is connected.

(7) *Location*. Each trap shall be located as close to its vent and to its fixture outlet as structural conditions will permit.

(8) *Length of Tailpiece*. The vertical distance from a trap to the fixture outlet shall not exceed 24 inches.

(9) *Installation*—(i) *Grade of Trap Arm*. The piping between a "P" trap and the fixture tee or the vented waste line shall be graded ¼ inch per foot towards the vent and in no event shall have a slope greater than its diameter. The vent opening at fixture tees shall not be below the weir of the "P" trap outlet. (ii) *Trap Arm Offset*. The piping between the "P" trap and vent may change direction or be offset horizontally with the equivalent of no more than 180 degrees total change in direction with a minimum of 90 degrees by any one fixture. (iii) *Concealed Traps*. Traps with mechanical joints shall be accessible for repair and inspection. (iv) *Removability of Traps, Etc.* Traps shall be designed and installed so the "U" bend is removable without removing the strainers from the fixture. Continuous waste and tail pieces which are permanetly attached to the "U" bend shall also be removable without removing the strainer from the fixture.

(b) *Cleanout Openings*—(1) *Location of Cleanout Fittings*. (i) Cleanouts shall be installed if the drainage system cannot be cleaned through fixtures, drains, or vents. Cleanouts shall also be provided when fittings of more than 45 degrees are used to affect an offset except where long turn ells are used which provide sufficient "sweep" for cleaning. (ii) A full size cleanout shall be installed at the upper end of any section of drain piping which does not have the required minimum slope of ¼ inch per foot grade. (iii) A cleaning tool shall not be required to pass through more than 360 degrees of fittings, excluding removable "P" traps, to reach any part of the drainage system.

(2) *Access to Cleanouts*. Cleanouts shall be accessible through an unobstructed minimum clearance of 12 inches directly in front of the opening. Each cleanout fitting shall open in a direction opposite to the flow or at right angles to the pipe. Concealed cleanouts that are not provided with access covers shall be extended to a point above the floor or outside of the mobile home, with pipe and fittings installed, as required, for drainage piping without sags and pockets.

(3) *Material*. Plugs and caps shall be brass or approved or listed plastic, with screw pipe threads.

(4) *Design*. Cleanout plugs shall have raised heads except that plugs at floor level shall have counter-sunk slots.

§ 1424.070 **Plumbing fixtures.**

(a) *General requirements*—(1) *Quality of fixtures*. Plumbing fixtures shall have smooth impervious finishes, be free from defects and concealed fouling surfaces, be capable of resisting road shock and vibration, and shall conform in quality and design to listed standards. Fixtures shall be permanently marked with the manufacturer's name.

(2) *Strainers*. The waste outlet of all plumbing fixtures, other than toilets, shall be equipped with a drain fitting that will provide an adequate unobstructed waterway.

(3) *Fixture Connections*. Fixture tailpieces and continuous wastes in exposed or accessible locations shall be not less than No. 20 Brown and Sharpe gage seamless drawn-brass tubing or other approved pipe or tubing materials. Inaccessible fixture connections shall be constructed according to the requirements for drainage piping. Each fixture tailpiece, continuous waste, or waste and overflow shall be not less than 1½ inches for sinks of two or more compartments, dishwashers, clothes washing machines, laundry tubs, bath tubs, and not less than 1¼ inches for lavatories and single compartment sinks having a 2 inch maximum drain opening.

(4) *Concealed Connections*. Concealed slip joint connections shall be provided with adequately sized unobstructed access panels and shall be accessible for inspection and repair.

(5) *Directional Fitting*. An approved or listed "Y" or other directional-type branch fitting shall be installed in every tailpiece or continuous waste that receives the discharge from food waste disposal units, dishwashing, or other force-discharge fixture or appliance. (See also § 1424.070(b)(4)(ii).)

(b) *Fixtures*—(1) *Spacing*. All plumbing fixtures shall be so installed with regard to spacing as to be reasonably accessible for their intended use.

(2) *Toilets*. (i) Each toilet shall be designed and manufactured according to approved or listed standards and shall be equipped with a water flushing device capable of adequately flushing and cleaning the bowl at each operation of the flushing mechanism. (ii) Toilet flushing devices shall be designed to replace the water seal in the bowl after each operation. Flush valves, flushometer valves, and ball cocks shall operate automatically to shut off at the end of each flush or when the tank is filled to operating capacity. (iii) Flush tanks shall be fitted with an overflow pipe large enough to prevent flooding at the maximum flow rate of the ball cock. Overflow pipes shall discharge into the toilet, through the tank. (iv) Toilets that have fouling surfaces that are not thoroughly washed at each discharge shall be prohibited. Any toilet that might permit the contents of the bowl to be siphoned back into the water system shall be prohibited. (v) Floor Connections. Toilets shall be securely bolted to an approved flange or other approved fitting which is secured to the floor by means of corrosion-resistant plated screws. The bolts shall be of solid brass or other corrosion-resistant material and shall be not less than ¼ inch in diameter. A watertight seal shall be made between the toilet and flange or other approved fitting by use of a gasket or sealing compound.

(3) *Shower Compartments*. (i) Each compartment shall be provided with an approved watertight receptor with sides and back extending 1 inch above the finished dam or threshold. In no case shall the depth of a shower receptor be less than 2 inches or more than 9 inches measured from the top of the finished dam or threshold to the top of the drain. The wall area shall be constructed of smooth, noncorrosive, and nonabsorbent waterproof materials to a height not less than 6 feet above the compartment floor level. Such walls shall form a watertight joint with each other and with the receptor or shower floor. The floor of the compartment shall slope uniformly to the drain at not less than one-fourth nor more than one-half inch per foot. (ii) The joint around the drain connection shall be made watertight by a flange, clamping ring, or other approved listed means. (iii) Shower doors and tub and shower enclosures shall be constructed so as to be waterproof and, if glazed, glazing shall comply with the Standard for Transparent Safety Glazing Material used in Buildings (ANSI Z97.1–1972). (iv) Prefabricated plumbing fixtures shall be approved or listed and shall comply with all applicable requirements relating to such fixtures.

(4) *Dishwashing Machines*. (i) Dishwashing machine shall not be directly connected to any waste piping, but shall discharge its waste through a fixed air gap installed above the machine. The drain connection from the air gap may connect to an individual trap, to a directional fitting installed in the sink tailpiece, or to the opening provided on the inlet side of a food waste disposal unit. (ii) Drain from a dishwashing machine shall not be connected to a sink tailpiece, continuous waste line, or trap on the discharge side of a food waste disposal unit.

(5) *Clothes Washing Machines*. (i) Clothes washing machines shall drain either into a properly vented trap, into a laundry tub tailpiece with watertight connections, into an open standpipe receptor, or over the rim of a laundry tub. (ii) Standpipes shall be 1½ inches minimum nominal iron pipe size, 1½ inches diameter nominal brass tubing not less than No. 20 Brown and Sharpe gage, or 1½ inches approved plastic materials. Receptors shall discharge into a vented trap or shall be connected to a laundry tub tailpiece by means of an approved or listed directional fitting. Each standpipe shall extend not less than 18 inches or more than 30 inches above its trap and shall terminate in an accessible location no lower than the top of clothes washing machine. (iii) Clothes washing

machine drain shall not be connected to the tailpiece, continuous waste, or trap of any sink or dishwashing machine.

(c) *Installation*—(1) *Access*. Each plumbing fixture and standpipe receptor shall be located and installed in a manner to provide easy access for usage, cleaning, repair and replacement.

(2) *Alignment*. Fixtures shall be set level and in true alignment with adjacent walls. Where practical, piping from fixtures shall extend to nearest wall.

(3) *Brackets*. Wall-hung fixtures shall be rigidly attached to walls by metal brackets or supports without any strain being transmitted to the piping connections. Flush tanks shall be securely fastened to toilets or to the wall with corrosive-resistant materials.

(4) *Tub Supports*. Bathtub rims at wall shall be supported on metal hangers or on end-grain wood blocking attached to the wall unless otherwise recommended by the manufacturer of the tub.

§ 1424.080 Hangers and supports.

(a) *Strains and Stresses*. Piping in a plumbing system shall be installed without undue strains and stresses, and provision shall be made for expansion, contraction, and structural settlement.

(b) *Piping Supports*. Piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents. Unless otherwise stated in the appendix the standards for specific materials shown in the Table in § 1424.040(a), or unless a lesser figure is specified by the pipe manufacturer, plastic drainage piping shall be supported at intervals not to exceed 4 feet and plastic water piping shall be supported at intervals not to exceed 3 feet.

(c) *Hangers and Anchors*. (1) Hangers and anchors shall be of sufficient strength to support their proportional share of the pipe alignments and prevent rattling.

(2) Piping shall be securely attached to the structure by proper hangers, clamps, or brackets which provide protection against motion, vibration, road shock, torque in the chassis, or other unusual conditions.

(3) Hangers and straps supporting plastic pipe shall not compress, distort, cut or abrade the piping and shall allow free movement of the pipe.

§ 1424.090 Water distribution system.

(a) *Water Supply*—(1) *Supply Piping*. Piping systems shall be sized to provide an adequate quantity of water to each plumbing fixture at a flow rate sufficient to keep the fixture in a clean and sanitary condition without any danger of backflow or siphonage (See Table in § 1424.090(f)).

(2) *Hot Water Supply*. Each mobile home equipped with a kitchen sink, and bathtub and/or shower shall be provided with a hot water supply system including a listed water heater.

(b) *Water Outlets and Supply Connections*—(1) *Water Connection*. Each mobile home with a water distribution system shall be equipped with a ¾-inch threaded inlet connection located within the rear half of the length of the mobile home. This connection shall be tagged or marked "Fresh Water Connection" (or "Fresh Water Fill"). A matching cap or plug shall be provided to seal the water inlet when it is not in use, and shall be permanently attached to the mobile home or water supply piping. A master cold water shut-off full flow valve shall be installed on the main feeder line in an accessible location. (i) When a mobile home includes expandable rooms or is composed of two or more units, fittings or connectors designed for such purpose shall be provided to connect any water piping. When not connected, the water piping shall be protected by means of matching caps or plugs.

(2) *Prohibited Connections*. (i) The installation of potable water supply piping or fixture or appliance connections shall be made in a manner to preclude the possibility of backflow. (ii) No part of the water system shall be connected to any drainage or vent piping.

(3) *Rim Outlets*. The outlets of faucets, spouts, and similar devices shall be spaced at least 1 inch above the flood level of the fixture.

(4) *Appliance Connections*. Water supplies connected to clothes washing or dishwashing machines shall be protected by an approved or listed fixed air gap provided within the appliance by the manufacturer.

(5) *Flushometer Valves or Manually Operated Flush Valves*. An approved or listed vacuum breaker shall be installed and maintained in the water supply line on the discharge side of a toilet flushometer valve or manually operated flush valve. Vacuum breakers shall have a minimum clearance of 6 inches above the flood level of the fixture to the critical level mark unless otherwise permitted in their approval.

(6) *Flush Tanks*. Toilet flush tanks shall be equipped with an approved antisiphon ball cock which shall be installed and maintained with its outlet or critical level mark not less than 1 inch above the full opening of the overflow pipe.

(c) *Water Heater Safety Devices*—(1) *Relief Valves*. (i) All water heaters shall be installed with approved and listed fully automatic valve or valves designed to provide temperature and pressure relief. (ii) Any temperature relief valve or combined pressure and temperature relief valve installed for this purpose shall have the temperature sensing element immersed in the hottest water within the upper 6 inches of the tank. It shall be set to start relieving at a pressure of 125 psi or the rated working pressure of the tank whichever is lower and at or below a water temperature of 210° F. (iii) Relief valves shall be provided with full-sized drains, with cross sectional areas equivalent to that of the relief valve outlet, which shall be directed downward and discharged beneath the mobile home. Drain lines shall be of a material listed for hot water distribution and shall drain fully by gravity, shall not be trapped, and shall not have their outlets threaded, and the end of the drain shall produce through the bottom board, not to exceed 1 inch.

(d) *Materials*—(1) *Piping Material*. Water pipe shall be of standard weight brass, galvanized wrought iron, galvanized steel, Type K, L or M copper tubing, approved or listed plastic or other listed material. (i) Plastic Piping. All plastic water piping and fittings in mobile homes must be approved or listed for use with hot water.

(2) *Fittings*. Appropriate fittings shall be used for all changes in size and where pipes are joined. The material and design of fittings shall conform to the type of piping used. Special consideration should be given to prevent corrosion when dissimilar metals are joined. (i) Fittings for screw piping shall be standard weight galvanized iron for galvanized iron and steel pipe, and of brass for brass piping. They shall be installed where required for change in direction, reduction of size, or where pipes are joined together. (ii) Fittings for copper tubing shall be cast brass or drawn copper (sweat-soldered) or shall be listed fittings for the purpose intended.

(3) *Prohibited Material*. Used piping materials shall not be permitted. Those pipe dopes, solder fluxes, oils, solvents, chemicals, or other substances that are toxic, corrosive, or otherwise detrimental to the water system shall not be used.

(e) *Installation of Piping*—(1) *Minimum Requirement*. All piping equipment, appurtenances, and devices shall be installed in workmanlike manner and shall conform with the provisions and intent of this standard.

(2) *Screw Pipe*. Iron pipe-size brass or galvanized iron or steel pipe fittings shall be joined with approved or listed standard pipe threads fully engaged in the fittings. Pipe ends shall be reamed to the full bore or the pipe. Pipe-joint compound shall be insoluble in water, shall be nontoxic and shall be applied to male threads only.

(3) *Solder Fittings*. Joints in copper water tube shall be made by the appropriate use of approved cast brass or wrought copper fittings, properly soldered together. The surface to be soldered shall be thoroughly cleaned bright mechanically. The joints shall be properly fluxed and made with approved solder.

(4) *Flared Fittings*. A flaring tool shall be used to shape the ends of flared tubing to match the flare of fittings.

(5) *Plastic Pipe and Fittings*. Plastic pipe and fittings shall be joined by installation methods recommended by the manufacturer or by a listed standard.

(f) *Size of Water Supply Piping*—(1) *Minimum Size*. The size of water supply piping and branch lines shall not be less than sizes shown in the following Table:

Minimum size tubing and pipe for water distribution systems

Number of fixtures	Tubing (nominal)		Pipe iron pipe size (inches)
	Diameter (inches)	Outer diameter (inches)	
1	[1]¼	⅜	¼
2	⅜	½	⅜
3	½	⅝	½
4	½	⅝	½
5 or more	¾	⅞	¾

[1] 6 ft maximum length.

Exceptions to Table. ⅜ inch nominal diameter or ½ inch OD minimum size for clothes washing or dishwashing machines, unless larger size is recommended by the fixture manufacturer. ½ inch nominal diameter or ⅝ inch OD minimum size for flushometer or metering type valves unless otherwise specified in their listing. No galvanized screw piping shall be less than ½ inch iron pipe size.

(2) *Sizing Procedure.* Both hot and cold water piping systems shall be computed by the following method: (i) Size of Branch. Start at the most remote outlet on any branch of the hot or cold water piping and progressively count towards the water service connection, computing the total number of fixtures supplied along each section of piping. Where branches are joined together, the number of fixtures on each branch shall be totalled so that no fixture is counted twice. Following down the left-hand column of the preceding Table a corresponding number of fixtures will be found. The required pipe or tubing size is indicated in the other columns on the same line. (ii) A water heater, food waste disposal unit, evaporative cooler or ice maker shall not be counted as a water-using fixture when computing pipe sizes.

(g) *Line Valves.* Valves, when installed in the water supply distribution system (except those immediately controlling one fixture supply) and when fully opened, shall have a cross-sectional area of the smallest orifice or opening, through which the water flows, at least equal to the cross-sectional area of the nominal size of the pipe in which the valve is installed.

§ 1424.100 Drainage systems.

(a) *General.* (1) Each fixture directly connected to the drainage system shall be installed with a water seal trap.

(2) The drainage system shall be designed to provide an adequate circulation of air in all piping with no danger of siphonage, aspiration, or forcing of trap seals under conditions of ordinary use.

(b) *Materials*—(1) *Pipe.* Drainage piping shall be standard weight steel, wrought iron, brass, copper tube DWV, listed plastic, cast iron, or other listed materials.

(2) *Fittings.* Drainage fittings shall be recessed drainage pattern with smooth interior waterways of the same diameter as the piping and shall be of a material conforming to the type of piping used. Drainage fittings shall be designed to provide for a ¼ inch per foot grade in horizontal piping. (i) Fittings for screw pipe shall be cast iron, malleable iron, brass, or listed plastic with standard pipe threads. (ii) Fittings for copper tubing shall be cast brass or wrought copper. (iii) Socket-type fittings for plastic piping shall comply with listed standards. (iv) Brass or bronze adaptor or wrought copper fittings shall be used to join copper tubing to threaded pipe.

(c) *Drain Outlets*—(1) *Location of Drain.* Each mobile home shall have only one drain outlet which shall terminate in the rear half section. A permanent marker, stating "Drain Outlet", shall be visibly located near the drain outlet.

(2) *Clearance from Drain Outlet.* The drain outlet shall be provided with a minimum clearance of 3 inches in any direction from all parts of the structure or appurtenances and with not less than 18 inches unrestricted clearance directly in front of the drain outlet.

(3) *Drain Connector.* The drain connector shall not be smaller than the piping to which it is connected and shall be equipped with a watertight cap or plug matching the drain outlet. The cap or plug shall be permanently attached to the mobile home or drain outlet.

(4) The drain outlet and drain connector shall not be less than 3 inches inside diameter.

(5) *Preassembly of Drain Lines.* Drain lines, provided by the manufacturer, located under the mobile home, designed to bring the drain system to one distribution point and which may be damaged in transit, must be designed for proper site assembly.

(d) *Fixture Connections.* Drainage piping shall be provided with approved or listed inlet fittings for fixture connections, correctly located according to the size and type of fixture to be connected.

(1) *Toilet Connection.* The drain connection for each toilet shall be 3 inches minimum inside diameter and shall be fitted with an iron, brass, or listed plastic floor flange adaptor ring securely screwed, soldered or otherwise permanently attached to the drain piping, in an approved manner and securely fastened to the floor.

(e) *Size of Drainage Piping*—(1) *Fixture Load.* Except as provided by § 1424.110(d)(2), drain pipe sizes shall be determined by the type of fixture and the total number connected to each drain. (i) A 1½ inch minimum diameter piping shall be required for one and not more than three individually vented fixtures. (ii) A 2-inch minimum diameter piping shall be required for four or more fixtures individually vented. (iii) A 3-inch minimum diameter piping shall be required for toilets.

(f) *Wet-Vented Drainage System.* Plumbing fixture traps may connect into a wet-vented drainage system which shall be designed and installed to accommodate the passage of air and waste in the same pipe.

(1) *Horizontal Piping.* All parts of a wet-vented drainage system, including the connected fixture drains, shall be horizontal except for wet-vented vertical risers which shall terminate with a 1½ inch minimum diameter continuous vent. Where required by structural design, wet-vented drain piping may be offset vertically when other vented fixture drains or relief vents are connected to the drain piping below the vertical offsets.

(2) *Size.* A wet-vented drain pipe shall be 2 inches minimum diameter and at least one pipe size larger than the largest connected trap or fixture drain. Not more than three fixtures may connect to a 2-inch diameter wet-vented drain system.

(3) *Length of Trap Arm.* Fixture traps shall be located within the distance given in § 1424.110(c)(5). Not more than one trap shall connect to a trap arm.

(g) *Offsets and Branch Fittings*—(1) *Changes in Direction.* Changes in direction of drainage piping shall be made by the appropriate use of approved or listed fittings, and shall be of the following angles: 11¼, 22½, 45, 60, or 90 degrees; or other approved or listed fittings or combination of fittings with equivalent radius or sweep.

(2) *Horizontal to Vertical.* Horizontal drainage lines, connecting with a vertical pipe shall enter through 45-degree "Y" branches, 60-degree "Y" branches, long-turn "TY" branches, sanitary "T" branches, or other approved or listed fittings or combination of fittings having equivalent sweep. Fittings having more than one branch at the same level shall not be used, unless the fitting is constructed so that the discharge from any one branch cannot readily enter any other branch. However, a double sanitary "T" may be used when the drain line is increased not less than two pipe sizes.

(3) *Horizontal to Horizontal and Vertical to Horizontal.* Horizontal drainage lines connecting with other horizontal drainage lines or vertical drainage lines connected with horizontal drainage lines shall enter through 45-degree "Y" branches, long-turn "TY" branches, or other approved or listed fittings or combination of fittings having equivalent sweep.

(h) *Grade of Horizontal Drainage Piping.* Except for fixture connections on the inlet side of the trap, horizontal drainage piping shall be run in practical alignment and have a uniform grade of not less than ¼ inch per foot toward the mobile home drain outlet. Where it is impractical, due to the structural features or arrangement of any mobile home, to obtain a grade of ¼ inch per foot, the pipe or piping may have a grade of not less than ⅛ inch per foot, when a full size clean-out is installed at the upper end.

§ 1424.110 Vents and venting.

(a) *General.* Each plumbing fixture trap shall be protected against siphonage and back pressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vents installed in accordance with the requirements of this section and as otherwise required by this standard.

(b) *Material*—(1) *Pipe.* Vent piping shall be standard weight steel, wrought iron, brass, copper tube DWV, listed plastic, cast iron or other approved or listed materials.

(2) *Fittings.* Appropriate fittings shall be used for all changes in direction or size and where pipes are joined. The material and design of vent fittings shall conform to the type of piping used. (i) Fittings for screw pipe shall be cast iron, malleable iron, plastic, or brass, with standard pipe threads. (ii) Fittings for copper tubing shall be cast brass or wrought copper. (iii) Fittings for plastic piping shall be made to approved or applicable standards. (iv) Brass adaptor

fittings or wrought copper shall be used to join copper tubing to threaded pipe. (v) Listed rectangular tubing may be used for vent piping only providing it has an open cross section at least equal to the circular vent pipe required. Listed transition fittings shall be used.

(c) *Size of Vent Piping*—(1) *Main Vent*. The drain piping for each toilet shall be vented by a 1½ inch minimum diameter vent or rectangular vent of venting cross section equivalent to or greater than the venting cross section of a 1½ inch diameter vent, connected to the main drain by one of the following methods: (i) A 1½ inch diameter (min.) individual vent pipe or equivalent directly connected to the toilet drain and extended undiminished in size through the roof, (ii) A 1½ inch diameter (min.) continuous vent or equivalent indirectly connected to the toilet drain piping through a 2-inch wet-vented drain that carries the waste of not more than one fixture, or, (iii) Two or more vented drains when at least one is wet-vented, or 2-inch diameter (minimum), and each drain is separately connected to the main drain.

(2) *Individual Vents*. Each individually vented fixture with a 1½ inch or smaller trap shall be provided with a vent pipe equivalent in area to a 1¼ inch nominal pipe size. The main vent, toilet vent and relief vent, and the continuous vent of wet-vented systems shall have an area equivalent to 1½ inch nominal pipe size.

(3) *Common Vent*. When two fixture traps located within the distance allowed from their vent have their trap arms connected separately at the same level into an approved double fitting, an individual vent pipe may serve as a common vent without any increase in size.

(4) *Intersecting Vents*. Where two or more vent pipes are joined together, no increase in size shall be required; however, the largest vent pipe shall extend full size through the roof.

(5) Distance of fixture trap from vent shall not exceed the values given in the following Table:

MAXIMUM DISTANCE OF FIXTURES TRAP FROM VENT

Size of fixture drain (inches):	*Distance trap to vent*
1¼	4 ft. 6 in.
1½	4 ft. 6 in.
2	5 ft. 0 in.
3	6 ft. 0 in.

(d) *Anti-Siphon Trap Vent*. Reserved pending development of material standard.

(e) *Grade and Connections*—(1) *Horizontal Vents*. Each vent shall extend vertically from its fixture "T" or point of connection with the waste piping to a point not less than 6 inches above the extreme flood level of the fixture it is venting before offsetting horizontally or being connected with any other vent pipe. Vents for horizontal drains shall connect above the centerline of the drain piping ahead (downstream) of the trap. Where required by structural conditions, vent piping may offset below the rim of the fixture at the maximum angle or height possible.

(f) *Vent Terminal*—(1) *Roof Extension*. Each vent pipe shall extend through its flashing and terminate vertically, undiminished in size, not less than 2 inches above the roof. Vent openings shall not be less than 3 feet, 0 inch away from any motor-driven air intake that opens into habitable areas.

(2) *Flashing*. The opening around each vent pipe shall be made watertight by an adequate flashing or flashing material.

(g) *Vent Caps*. Vent caps, if provided, shall be of the removable type (without removing the flashing from the roof). When vent caps are used for roof space ventilation and the caps are identical to vent caps used for the plumbing system, plumbing system caps shall be identified with permanent markings.

§ 1424.120 Test and inspection.

(a) *Water System*. All water piping in the water distribution system shall be subjected to a pressure test. The test shall be made by subjecting the system to air or water at 100 psi for 15 minutes without loss of pressure.

(b) *Drainage and Vent System and Plumbing Fixtures*. The waste and vent system shall be tested by one of the three following alternate methods for evidence or indication of leakage:

(1) *Water Test*. Before plumbing fixtures are connected, all of the openings into the piping shall be plugged and the entire piping system subjected to a static water test for 15 minutes by filling it with water to the top of the highest vent opening. There shall be no evidence of leakage.

(2) *Air Test*. After all fixtures have been installed, the traps filled with water, and the remaining openings securely plugged, the entire system shall be subjected to a 2-inch (manometer) water column air pressure test. If the system loses pressure, leaks may be located with smoke pumped into the system, or with soap suds spread on the exterior of the pipe (Bubble test).

(3) *Flood Level Test*. The mobile home shall be in a level position, all fixtures shall be connected, and the entire system shall be filled with water to the rim of the toilet bowl. (Tub and shower drains shall be plugged). After all trapped air has been released, the test shall be sustained for not less than 15 minutes without evidence of leaks. Then the system shall be unplugged and emptied. The waste piping above the level of the toilet bowl shall then be tested and show no indication of leakage when the high fixtures are filled with water and emptied simultaneously to obtain the maximum possible flow in the drain piping.

(c) *Fixture Test*. The plumbing fixtures and connections shall be subjected to a flow test by filling them with water and checking for leaks and retarded flow while they are being emptied.

(d) *Shower Compartments*. Nonmetallic shower compartments and receptors shall be tested for leaks prior to being covered by finish material. Each pan shall be filled with water to the top of the dam for not less than 15 minutes.

Subpart F—Heating, Cooling, and Fuel-Burning Systems

§ 1425.010 Scope.

This Subpart F of this standard covers the heating, cooling and fuel burning equipment installed within, on, or external to a mobile home.

§ 1425.020 Definitions.

(a) The definitions in this party apply to § 1425.000 only.

(1) "Accessible," when applied to a fixture, connection, appliance or equipment, means having access thereto, but which may require the removal of an access panel, door or similar obstruction.

(2) "Air Conditioner Blower Coil System" means a comfort cooling appliance where the condenser is placed external to the mobile home and evaporator with circulating blower attached to the mobile home air supply duct system. Provision must be made for a return air system to the evaporator/blower section. Refrigerant connection between the two parts of the system is accomplished by tubing.

(3) "Air Conditioner Split System" means a comfort cooling appliance where the condenser is placed external to the mobile home and the evaporator incorporated into the heating appliance within the mobile home. Refrigerant connection between the two parts of the system is accomplished by tubing.

(4) "Air Conditioning Condenser Section" means that portion of a refrigerated air cooling or (in the case of a heat pump) heating system which includes the refrigerant pump (compressor) and the external heat exchanger.

(5) "Air Conditioning Evaporator Section" means a heat exchanger used to cool or (in the case of a heat pump) heat air from the living space for use in comfort cooling (or heating) the living space.

(6) "Air Conditioning Self Contained System" means a comfort cooling appliance combining the condenser, evaporator and comfort air circulating blower into one unit placed external to the mobile home with connecting ducts to the mobile home for the supply and return air systems.

(7) "Air Duct" means conduits or passageways for conveying air to or from heating, cooling, air conditioning or ventilation equipment, but not including the plenum.

(8) "Automatic Pump (Oil Lifter)" means a pump, not an integral part of the oil-burning appliance, that automatically pumps oil from the supply tank and delivers the oil by gravity under a constant head to an oil-burning appliance.

(9) "BTU. British Thermal Units" means the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

(10) "BTUH" means British thermal units per hour.

(11) "Burner" means a device for the final conveyance of fuel or a mixture of fuel and air to the combustion zone.

(12) "Class 0 Air Ducts" means ducts of materials and connectors having a fire-hazard classification of zero.

(13) "Class 1 Air Ducts" means ducts of materials and connectors having a flame-spread rating of not over 25 without evidence of continued progressive combustion and a smoke-developed rating of not over 50.

(14) "Class 2 Air Ducts" means ducts of materials and connectors having a flame-spread rating of not over 50 without evidence of continued progressive combustion and a smoke-developed rating of not over 50 for the inside surface and not over 100 for the outside surface.

(15) "Clearance" means the distance between the appliance, chimney, vent, chimney or vent connector or plenum and the nearest surface.

(16) "Connector-Gas Appliance" means a flexible or semi-rigid connector listed as conforming to ANSI Standard Z21.24, Metal Connectors for Gas Appliance, used to convey fuel gas, three feet or less in length (six feet or less for gas ranges), between a gas outlet and a gas appliance in the same room with the outlet.

(17) "External Combination Heating/Cooling System" means a comfort conditioning system placed external to the mobile home with connecting ducts to the mobile home for the supply and return air systems.

(18) "Factory-Built Fireplace" means a hearth, fire chamber and chimney assembly composed of listed factory-built components assembled in accordance with the terms of listing to form a complete fireplace.

(19) "Fireplace Stove" means a chimney connected solid fuel-burning stove having part of its fire chamber open to the room.

(20) "Fuel Gas Piping System" means the arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel gas to the appliance(s).

(21) "Fuel Oil Piping System" means the arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel oil to the appliance(s).

(22) "Gas Clothes Dryer" means a device used to dry wet laundry by means of heat derived from the combustion of fuel gases. Dryer classifications are as follows: (i) Type 1. Factory-built package, multiple produced. Primarily used in family living environment. May or may not be coin-operated for public use. Usually the smallest unit physically and in function output. (ii) Type 2. Factory-built package, multiple produced. Used in business with direct intercourse of the function with the public. May or may not be operated by public or hired attendant. May or may not be coin-operated. Not designed for use in individual family living environment. May be small, medium or large in relative size.

(23) "Gas Refrigerator" means a gas-burning appliance which is designed to extract heat from a suitable chamber.

(24) "Gas Supply Connection" means the terminal end or connection to which a gas supply connector is attached.

(25) "Gas Supply Connector, Mobile Home" means a listed flexible connector designed for connecting the mobile home to the gas supply source.

(26) "Gas Vents" means factory-built vent piping and vent fittings listed by an approved testing agency, that are assembled and used in accordance with the terms of their listings, for conveying flue gases to the outside atmosphere. (i) "Type B Gas Vent" means a gas vent for venting gas appliances with draft hoods and other gas appliances listed for use with Type B Gas Vents. (ii) "Type BW Gas Vent" means a gas vent for venting listed gas-fired vented wall furnaces.

(27) "Heat Producing Appliance" means all heating and cooking appliances and fuel burning appliances.

(28) "Heating Appliance" means an appliance for comfort heating of a mobile home or for water heating.

(29) "Liquefied Petroleum Gases." The terms "Liquefied petroleum gases," "LPG" and "LP-Gas" as used in this standard shall mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene butanes (normal butane or isobutane), and butylenes.

(30) "Plenum" means an air compartment which is part of an air-distributing system, to which one or more ducts are connected. (i) Furnace supply plenum is a plenum attached directly to, or an integral part of, the air supply outlet of the furnace. (ii) Furnace return plenum is a plenum attached directly to, or an integral part of, the return inlet of the furnace.

(31) "Quick-Disconnect Device" means a hand-operated device which provides a means for connecting and disconnecting a gas supply or connecting gas systems and which is equipped with an automatic means to shut off the gas supply when the device is disconnected.

(32) "Readily Accessible" means direct access without the necessity of removing any panel, door, or similar obstruction.

(33) "Roof Jack" means that portion of a mobile home heater flue or vent assembly, including the cap, insulating means, flashing, and ceiling plate, located in and above the roof of a mobile home.

(34) "Sealed Combustion System Appliance" means an appliance which by its inherent design is constructed so that all air supplied for combustion, the combustion system of the appliance, and all products of combustion are completely isolated from the atmosphere of the space in which it is installed.

(35) "Water Heater" means an appliance for heating water for domestic purposes other than for space heating.

§ 1425.030 Minimum standards.

Heating, cooling and fuel burning appliances and systems in mobile homes shall be free of defects and shall conform to applicable standards in the following table unless otherwise specified in this standard. (See § 1420.040).

Type	ANSI	UL	Other standards
Appliances:			
Air conditioners, central cooling		465	
Liquid fuel-burning heating appliances for mobile homes and travel trailers.	A147.1—1969	307(A)—1969	
Electric space heating equipment		573	
Gas-heating appliances for mobile homes and travel trailers.		307(b)—1965	
Gas clothes dryers	Z21.5.1—1973		
Commercial gas-fired and electrically-heated hot water generating equipment.			NSF-5—1959
Gas-fired absorption summer air conditioning appliances.	Z21.40.1—1973		
Gas-fired gravity and forced air central furnaces	Z21.47—1973		
Gas-fired gravity and fan-type sealed combustion system wall furnaces.	Z21.44—1973		
Commercial cooking and warming equipment		NSF-4—1967	
Household cooking gas appliances	Z21.1—1972		
Refrigerators using gas fuel	Z21.19—1971		
Automatic storage type water heaters with input less than 75,000 Btu/h.	Z21.10.1—1974		
Heating equipment, electric central air		1096	
Heat pumps		559	
Ferrous pipe and fittings:			
Black and hot dipped zinc-coated (galvanized) welded and seamless steel pipe for ordinary uses.			ASTM A120—1972; WW-P-406D—1973
Electric-resistance welded coiled steel tubing for gas and fuel oil lines.			ASTM A539—1973
Pipe threads	B2.1—1968		
Wrought steel and wrought iron pipe	B36.10—1970		
Nonferrous pipe, tubing, and fittings:			
Seamless copper water tube			ASTM B88—1972
Seamless copper tube for air conditioning and refrigeration field service.			ASTM B280—1973
Metal connectors for gas appliances	A21.24—1973		
Manually operated gas valves	Z21.15—1969		
Trailer standard for coated flexible metal gas connectors for exterior use.		IAPMO TSC 9—1973	
Wrought seamless copper and copper alloy tube			ASTM B251—1971
Seamless copper pipe, standard size			ASTM B42—1972, WW-P-377D—1962

Type	ANSI	UL	Other standards
Miscellaneous:			
Air ducts		181—1972	
Flame tests of flame-resistant fabrics		214—1971	
Tube fittings for flammable and combustible fluids and refrigeration service.		109—1972	
LPG containers and accessories			ASME, DOT
Pigtails, expansion coils, and flexible hose connectors for liquified petroleum gas.		569—1973	
Roof jacks for trailer coaches		311—1971	
Relief valves and automatic gas shutoff devices for hot water supply systems.	Z21.22—1971		
Automatic gas ignition systems and components	Z21.20—1971		
Automatic valves for gas appliances	Z21.21—1974		
Gas appliance thermostats	A21.23—1974		
Gas vents	A131.2—1973	441—1973	
Factory-built chimneys	A131.1—1971	103—1971	
Factory-built fireplaces			GAL
Installation of oil burining equipment	A95.1—1974		NFPA No. 31—1974
Installation of gas appliances, gas piping in buildings			NFPA No. 54—1974
Resident type warm air heating and air conditioning			NFPA No. 90B—1973
Tests for flammability of plastic materials for parts in devices and appliances.		94—1974	
Storage and handling of liquefied petroleum gas	A106.1—1974		NFPA No. 58—1974

§ 1425.040 Fuel supply systems.

(a) *LP-Gas System Design and Service Line Pressure.* (1) Systems shall be of the vapor-withdrawal type.

(2) Gas, at a pressure not over 14 inches water column (½ psi), shall be delivered from the system into the gas supply connection.

(b) *LP-Gas Containers.*—(1) *Maximum Capacity.* No more than two containers having an individual water capacity of not more than 105 pounds (approximately 45 pounds LP-Gas capacity), shall be installed on or in a compartment of any mobile home.

(2) *Construction of Containers.* Containers shall be constructed and marked in accordance with the specifications for LP-Gas Containers of the U.S. Department of Transportation (DOT) or the Rules for Construction of Unfired Pressure Vessels, Section VIII, Division 1, ASME Boiler and Pressure Vessel Code. ASME Containers shall have a design pressure of at least 312.5 psig. (i) Container supply systems shall be arranged for vapor withdrawal only. (ii) Container openings for vapor withdrawal shall be located in the vapor space when the container is in service or shall be provided with a suitable internal withdrawal tube which communicates with the vapor space in or near the highest point in the container when it is mounted in service position, with the vehicle on a level surface. Containers shall be permanently and legibly marked in a conspicuous manner on the outside to show the correct mounting position and the position of the service outlet connection. The method of mounting in place shall be such as to minimize the possibility of an incorrect positioning of the container.

(3) *Location of LP-Gas Containers and Systems.* (i) LP-Gas Containers shall not be installed, nor shall provisions be made for installing or storing any LP-Gas container, even temporarily, inside any mobile home except for listed, completely self-contained hand torches, lanterns, or similar equipment with containers having a maximum water capacity of not more than 2½ pounds (approximately one pound LP-Gas capacity).

(ii) Containers, control valves, and regulating equipment, when installed, shall be mounted on the "A" frame of the mobile home, or installed in a compartment that is vaportight to the inside of the mobile home and accessible only from the outside. The compartment shall be ventilated at top and bottom to facilitate diffusion of vapors. The compartment shall be ventilated with two vents having an aggregate area of not less than two percent of the floor area of the compartment and shall open unrestricted to the outside atmosphere. The required vents shall be equally distributed between the floor and ceiling of the compartment. If the lower vent is located in the access door or wall, the bottom edge of the vent shall be flush with the floor level of the compartment. The top vent shall be located in the access door or wall with the bottom of the vent not more than 12 inches below the ceiling level of the compartment. All vents shall have an unrestricted discharge to the outside atmosphere. Access doors or panels of compartments shall not be equipped with locks or require special tools or knowledge to open. (iii) Permanent and removable fuel containers shall be securely mounted to prevent jarring loose, slipping or rotating and the fastenings shall be designed and constructed to withstand static loading in any direction equal to twice the weight of the tank and attachments when filled with fuel, using a safety factor of not less than four based on the ultimate strength of the material to be used.

(4) *LP-Gas Container Valves and Accessories.* (i) Valves in the assembly of a two-cylinder system shall be arranged so that replacement of containers can be made without shutting off the flow of gas to the appliance(s). This provision is not to be construced as requiring an automatic change-over device. (ii) Shutoff valves on the containers shall be protected as follows, in transit, in storage, and while being moved into final utilization by setting into a recess of the container to prevent possibility of their being struck if container is dropped upon a flat surface, or by ventilated cap or collar, fastened to the container, capable of withstanding a blow from any direction equivalent to that of a 30-pound weight dropped 4 feet. Construction shall be such that the blow will not be transmitted to the valve. (iv) Regulators shall be connected directly to the container shutoff valve outlets or mounted securely by means of a support bracket and connected to the container shutoff valve or valves with listed high pressure connections. If the container is permanently mounted the connector shall be as required above or with a listed semi-rigid tubing connector.

(5) *LP-Gas Safety Devices.* (i) DOT containers shall be provided with safety relief devices as required by the regulations of the U.S. Department of Transportation. ASME containers shall be provided with relief valves in accordance with Subsection 221 of the Standard for the Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58-1974; ANSI Z106.1-1974). Safety relief valves shall have direct communication with the vapor space of the vessel. (ii) The delivery side of the gas pressure regulator shall be equipped with a safety relief device set to discharge at a pressure not less than two times and not more than three times the delivery pressure of the regulator. (iii) Systems mounted on the "A" frame assembly shall be so located that the discharge from the safety relief devices shall be into the open air and not less than three feet horizontally from any opening into the mobile home below the level of such discharge. (iv) Safety relief valves located within liquefied petroleum gas container compartments may be less than three feet from openings provided the bottom vent of the compartment is at the same level or lower than the bottom of any opening into the vehicle, or the compartment is not located on the same wall plane as the opening(s) and is at least two feet horizontally from such openings.

(6) *LP-Gas System Enclosure and Mounting.* (i) Housings and enclosures shall be designed to provide proper ventilation at least equivalent to that specified in § 1425.040(b)(3)(ii). (ii) Doors, hoods, domes, or portions of housings and enclosures required to be removed or opened for replacement of containers shall incorporate means for clamping them firmly in place and preventing them from working loose during transit. (iii) Provisions shall be incorporated in the assembly to hold the containers firmly in position and prevent their movement during transit. (iv) Containers shall be mounted on a substantial support or a base secured firmly to the vehicle chassis. Neither the container nor its support shall extend below the mobile home frame.

(c) *Oil Tanks*—(1) *Installation.* Oil tanks and listed automatic pumps (oil lifters) installed for gravity flow of oil to heating equipment shall be installed so that the top of the tank is no higher than 8 feet above the appliance oil control and the bottom of the tank is not less than 18 inches above the appliance oil control.

(2) *Auxiliary Oil Storage Tank.* Oil supply tanks affixed to a mobile home

shall be so located as to require filling and draining from the outside and shall be in a place readily available for inspection. If the fuel supply tank is located in a compartment of a mobile home, the compartment shall be ventilated at the bottom to permit diffusion of vapors and shall be insulated from the structural members of the body. Tanks so installed shall be provided with an outside fill and vent pipe and an approved liquid level gage.

(3) *Shutoff Valve.* A readily accessible, approved manual shutoff valve shall be installed at the outlet of an oil supply tank. The valve shall be installed to close against the supply.

(4) *Fuel Oil Filters.* All oil tanks, except for integrally mounted tanks, shall be equipped with an approved oil filter or strainer located downstream from the tank shutoff valve. The fuel oil filter or strainer shall contain a sump with a drain for the entrapment of water.

§ 1425.050 Piping systems.

§ 1425.051 Gas piping systems.

(a) *General.* The requirements of this Section shall govern the installation of all fuel gas piping attached to any mobile home. Gas delivered into the gas supply system shall be at a pressure not exceeding 14 inch water column (½ psi). None of the requirements listed in this Section shall apply to the piping supplied as a part of an appliance. All exterior openings around piping, ducts, plenums or vents shall be sealed to resist the entrance of rodents.

(b) *Materials.* All materials used for the installation, extension, alteration, or repair of any gas piping system shall be new and free from defects or internal obstructions. It shall not be permissible to repair defects in gas piping or fittings. Inferior or defective materials shall be removed and replaced with acceptable material. The system shall be made of materials having a melting point of not less than 1,450 F, except as provided in § 1425.051(e). They shall consist of one or more of the materials described in § 1425.051(b) (1) through (4).

(1) Steel or wrought-iron pipe shall comply with ANSI Standard B36.10-1970 for Wrought-Steel and Wrought-Iron Pipe. Threaded brass pipe in iron pipe sizes may be used. Threaded brass pipe shall comply with Standard Sizes and Specifications for Seamless Red Brass Pipe (ASTM B43-66).

(2) Fittings for gas piping shall be wrought iron, malleable iron, steel, or brass (containing not more than 75 percent copper).

(3) Copper tubing shall be annealed type, Grade K or L, conforming to the Specifications for Seamless Copper Water Tube (ASTM B88-72), or shall comply with the Specifications for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service, ASTM B280-73. When used on system designed for natural gas, such tubing shall be internally tinned.

(4) Steel tubing shall have a minimum wall thickness of 0.032 inch for tubing of ½ inch diameter and smaller and 0.049 inch for diameters ½ inch and larger. Steel tubing shall be constructed in accordance with ASTM Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines (ASTM A539-73), and shall be externally corrosion protected.

(c) *Piping Design.* Each mobile home requiring fuel gas for any purpose shall be equipped with a fuel gas piping system that is designed for LP-Gas only or with a natural gas piping system acceptable for LP-Gas.

(1) Where fuel gas piping is to be installed in both portions of an expandable or dual mobile home, the design and construction of the crossover shall be as follows: (i) There shall be only one point of crossover which shall be located not more than 18 inches from either the front or rear wall and shall be readily accessible from the exterior of the mobile home. (ii) The connector between units shall be a listed type for exterior use, sized in accordance with § 1425.051(d). (iii) The connection shall be made by a listed "quick disconnect" device which shall be designed to provide a positive seal of the supply side of the gas system when such device is separated. (iv) The flexible connector and "quick disconnect" device shall be provided with protection from mechanical and impact damage and located to minimize the possibility of tampering. (v) Suitable protective coverings for the "quick disconnect" device, when separated, shall be permanently attached to the device or flexible connector. (vi) A 3 inch by 1¾ inch minimum size tag made of etched, metal-stamped or embossed brass, stainless steel, anodized or alclad aluminum not less than 0.020 inch thick, or other approved material (e.g., 0.005 inch plastic laminates) shall be permanently attached on the exterior wall adjacent to the access to the "quick disconnect" device. Each tag shall be legibly inscribed with the following information using letters no smaller than ¼ inch high:

Do Not Use Tools to Separate the "Quick-Disconnect" Device.

(d) *Gas Pipe Sizing.* Gas piping systems shall be sized so that the pressure drop to any appliance inlet connection from any gas supply connection, when all appliances are in operation at maximum capacity, is not more than 0.5 inch water column as determined on the basis of test, or in accordance with the following Table. The natural gas supply connection(s) shall be not less than the size of the gas piping but shall be not smaller than ¾ inch nominal pipe size.

Part I

Maximum Capacity of Different Sizes of Pipe and Tubing in Thousands of Btu's Per Hour of Natural Gas For Gas Pressures of 0.5 Psig or Less and a Maximum Pressure Drop of ½ Inch Water Column

	Iron Pipe Sizes											Tubing									
	Length in Feet											Length in Feet									
I.D.	10	20	30	40	50	60	70	80	90	100	O.D.	10	20	30	40	50	60	70	80	90	100
¼"	43	29	24	20	18	16	15	14	13	12	⅜"	27	18	15	13	11	10	9	9	8	8
⅜"	95	65	52	45	40	36	33	31	29	27	½"	56	38	31	26	23	21	19	18	17	16
½"	175	120	97	82	73	66	61	57	53	50	⅝"	113	78	62	53	47	43	39	37	34	33
¾"	360	250	200	170	151	138	125	118	110	103	¾"	197	136	109	93	83	75	69	64	60	57
1"	680	465	375	320	285	260	240	220	215	195	⅞"	280	193	155	132	117	106	98	91	85	81

Part II

Maximum Capacity of Different Sizes of Pipe and Tubing in Thousands of Btu's Per Hour of Undiluted Liquefied Petroleum Gas Based on a Maximum Pressure Drop of ½ Inch Water Column

	Iron Pipe											Tubing									
	Length in Feet											Length in Feet									
I.D.	10	20	30	40	50	60	70	80	90	100	O.D.	10	20	30	40	50	60	70	80	90	100
¼"	67	46	37	31	28	25	23	21	20	19	⅜"	39	26	21	19	—	—	—	—	—	—
⅜"	147	101	81	70	62	56	51	48	45	42	½"	92	62	50	41	37	35	31	29	27	26
½"	275	189	152	129	114	103	96	89	83	78	⅝"	199	131	107	90	79	72	67	62	59	55
¾"	567	393	315	267	237	217	196	185	173	162	¾"	329	216	181	145	131	121	112	104	95	90
1"	1071	732	590	504	448	409	378	346	322	307	⅞"	501	346	277	233	198	187	164	155	146	138

(e) *Joints for Gas Pipe.* All pipe joints in the piping system, unless welded or brazed, shall be threaded joints that comply with ANSI Standard Pipe Threads (Except Dryseal) B2.1—1968. Right and left nipples or couplings shall not be used. Unions, if used, shall be of ground joint type. The material used for welding or brazing pipe connections shall have a melting temperature in excess of 1,000 F.

(f) *Joints for Tubing.* (1) Tubing joints shall be made with either a single or a double flare of 45 degrees in accordance with SAE Standard J 533A or with other listed vibration-resistant fittings, or joints may be brazed with material having a melting point exceeding 1,000 F. Metallic ball sleeve compression-type tubing fittings shall not be used.

(2) Steel tubing joints shall be made with a double-flare in accordance with SAE Standard J 533A.

(g) *Pipe Joint Compound.* Screw joints shall be made up tight with listed pipe joint compound, insoluble in liquefied petroleum gas, and shall be applied to the male threads only.

(h) *Concealed Tubing.* Tubing shall not be run inside walls, floors, partitions, or roofs. Where tubing passes through walls, floors, partitions, roofs, or similar installations, such tubing shall be protected by the use of weather resistant grommets that shall snugly fit both the tubing and the hole through which the tubing passes.

(i) *Concealed Joints.* Piping or tubing joints shall not be located in any floor, wall partition, or similar concealed construction space.

(j) *Location of Gas Supply Connection.* (1) For LP-Gas-only systems the supply connection shall be located at the "A" frame, container recess, or in the rear half of the total length of the mobile home and within 18 inches from the left (road) side wall, and should be as close as possible to a point 30 feet from the front of the mobile home.

(2) For combination LP-Gas and natural gas systems, the natural gas supply connection shall be located under the rear half of the total length of the mobile home and within 24 inches of the left (road) side wall and be located as close as possible to a point 30 feet from the front of the mobile home. The natural gas supply connection shall not be located beneath any exit door. An additional connection, if used, shall be located at the "A" frame. The system shall be sized to provide adequate capacity from either supply connection for natural gas.

(k) *Identification of Gas Supply Connections.* Each mobile home shall have permanently affixed to the exterior skin at or near each gas supply connection or the end of the pipe, a tag of 3 inches by 1¾ inches minimum size, made of etched, metal-stamped or embossed brass, stainless steel, anodized or alclad aluminum not less than 0.020 inch thick, or other approved material (e.g., 0.005 inch plastic laminates), which reads (as appropriate) in accordance with one of the following label designs depending upon the fuel used. The connector capacity indicated on this tag shall be equal to or greater than the total Btuh rating of all intended gas appliances.

LP-Gas System

This gas piping system is designed for use of liquefied petroleum gas only.

DO NOT CONNECT NATURAL GAS TO THIS SYSTEM.

CONTAINER SHUTOFF VALVES SHALL BE CLOSED DURING TRANSIT..

When connecting to lot outlet, use a listed gas supply connector

for mobile homes rated at ☐100,000 Btuh or more.
☐250,000 Btuh

Before turning on gas, make certain all gas connections have been made tight, all appliance valves are turned off, and any unconnected outlets are capped.

After turning on gas, test gas piping and connections to appliances for leakage with soapy water or bubble solution, and light all pilots.

Combination LP-Gas and Natural Gas System

This gas piping system is designed for use of either liquefied petroleum gas or natural gas.

NOTICE: BEFORE TURNING ON GAS BE CERTAIN APPLIANCES ARE DESIGNED FOR THE GAS CONNECTED AND ARE EQUIPPED WITH CORRECT ORIFICES. SECURELY CAP THIS INLET WHEN NOT CONNECTED FOR USE.

When connecting to lot outlet, use a listed gas supply connector

for mobile homes rated at ☐100,000 Btuh or more.
☐250,000 Btuh

Before turning on gas, make certain all gas connections have been made tight, all appliance valves are turned off, and any unconnected outlets are capped.

After turning on gas, test gas piping and connections to appliances for leakage with soapy water or bubble solution, and light all pilots.

(l) *Gas Supply Connectors*—(1) *LP-Gas*. A listed LP-Gas flexible connector conforming to the UL Standard for Pigtails, Expansion Coils and Flexible Hose Connectors for LP-Gas (UL 569-1973) or equal shall be supplied when the fuel gas piping system is designed for the use of LP-Gas and cylinder(s) and regulator(s) are supplied.

(2) *Appliance Connections*. All gas burning appliances shall be connected to the fuel piping. Materials as provided in § 1425.051(b) or listed appliance connectors shall be used. Listed appliance connectors when used shall not run through walls, floors, ceilings or partitions. Connectors of aluminum shall not be used outdoors. A mobile home containing an LPG or combination LP-natural-gas-system may be provided with a gas outlet to supply exterior appliances when installed in accordance with the following: (i) No portion of the completed installation shall project beyond the wall of the mobile home. (ii) The outlet shall be provided with an approved "quick-disconnect" device, which shall be designed to provide a positive seal on the supply side of the gas system when the appliance is disconnected. A shutoff valve shall be installed immediately upstream of the quick-disconnect device. The complete device shall be provided as part of the original installation. (iii) Protective caps or plugs for the "quick-disconnect" device, when disconnected, shall be permanently attached to the mobile home adjacent to the device. (iv) A tag shall be permanently attached to the outside of the exterior wall of the mobile home as close as possible to the gas supply connection. The tag shall indicate the type of gas and the Btuh capacity of the outlet and shall be legibly inscribed as follows:

This outlet is designed for use with gas portable appliances whose total input do not exceed ______ BTUH. Replace protective covering over connector when not in use.

(3) *Valves*. A shutoff valve shall be installed in the fuel piping outside of each gas appliance but inside the mobile home structure, upstream of the union or connector in addition to any valve on the appliance. The shutoff valve shall be located within 6 feet of a cooking appliance and within 3 feet of any other appliance. A shutoff valve may serve more than one appliance if located as required above. Shutoff valves used in connection with gas piping shall be of a type designed and listed for use on LP-Gas.

(4) *Gas Piping System Openings*. All openings in the gas piping system shall be closed gas-tight with threaded pipe plugs or pipe caps.

(5) *Electrical Ground*. Gas piping shall not be used for an electrical ground.

(6) *Couplings*. Pipe couplings and unions shall be used to join sections of threaded piping. Right and left nipples or couplings shall not be used.

(7) *Hangers and Supports*. All gas piping shall be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than 4 feet, except where adequate support and protection is provided by structural members. Solid-iron-pipe gas supply connection(s) shall be rigidly anchored to a structural member within 6 inches of the supply connection(s).

(8) *Testing for Leakage*. (i) Before appliances are connected, piping systems shall stand a pressure of at least six inches mercury or three PSI gage for a period of not less than ten minutes without showing any drop in pressure. Pressure shall be measured with a mercury manometer or slope gage calibrated so as to be read in increments of not greater than one-tenth pound, or an equivalent device. The source of pressure shall be isolated before the pressure tests are made. Before a test is begun, the temperature of the ambient air and of the piping shall be approximately the same, and constant air temperature be maintained throughout the test. (ii) After appliances are connected, the piping system shall be pressurized to not less than 10 inches nor more than 14 inches water column and the appliance connections tested for leakage with soapy water or bubble solution.

§ 1425.052 Oil piping systems.

(a) *General*. The requirements of this section shall govern the installation of all liquid fuel piping attached to any mobile home. None of the requirements listed in this section shall apply to the piping in the appliance(s).

(b) *Materials*. All materials used for the installation extension, alteration, or repair, of any oil piping systems shall be new and free from defects or internal obstructions. The system shall be made of materials having a melting point of not less than 1,450°F., except as provided in § 1425.052(d). They shall consist of one or more of the materials described in § 1425.052(b) (1) through (4). (1) Steel or wrought-iron pipe shall comply with American National Standard for Wrought-Steel or Wrought-Iron Pipe, B36.10—1970. Threaded copper or brass pipe in iron pipe sizes may be used. (2)

Fittings for oil piping shall be wrought iron, malleable iron, steel, or brass (containing not more than 75 percent copper). (3) Copper tubing shall be annealed type, Grade K or L conforming to the Specifications for Seamless Copper Water Tube (ASTM B88-72), or shall comply with the specifications for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service, ASTM B280-73. (4) Steel tubing shall have a minimum wall thickness of 0.032 inch for diameters up to ½ inch and 0.049 inch for diameters ½ inch and larger. Steel tubing shall be constructed in accordance with the Specification for Electric-Resistance Welded Coiled Steel Tubing for Gas and Fuel Oil Lines (ASTM A539-73) and shall be externally corrosion protected.

(c) *Size of Oil Piping.* The minimum size of all fuel oil tank piping connecting outside tanks to the appliance shall be no smaller than ⅜-inch OD copper tubing or ¼-inch IPS. If No. 1 fuel is used with a listed automatic pump (fuel lifter), copper tubing shall be sized as specified by the pump manufacturer.

(d) *Joints for Oil Piping.* All pipe joints in the piping system, unless welded or brazed, shall be threaded joints which comply with American National Standard for Pipe Threads (Except Dryseal), B2.1—1968. The material used for brazing pipe connections shall have a melting temperature in excess of 1,000° F.

(e) *Joints for Tubing.* Joints in tubing shall be made with either a single or double flare of the proper degree, as recommended by the tubing manufacturer, by means of listed tubing fittings, or brazed with materials having a melting point in excess of 1,000°F.

(f) *Pipe Joint Compound.* Threaded joints shall be made up tight with listed pipe joint compound which shall be applied to the male threads only.

(g) *Couplings.* Pipe couplings and unions shall be used to join sections of threaded pipe. Right and left nipples or couplings shall not be used.

(h) *Grade of Piping.* Fuel oil piping installed in conjunction with gravity feed systems to oil heating equipment shall slope in a gradual rise upward from a central location to both the oil tank and the appliance in order to eliminate air locks.

(i) *Strap Hangers.* All oil piping shall be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than 4 feet, except where adequate support and protection is provided by structural members. Solid-iron-pipe oil supply connection(s) shall be rigidly anchored to a structural member within 6 inches of the supply connection(s).

(j) *Testing for Leakage.* Before setting the system in operation, tank installations and piping shall be checked for oil leaks with fuel oil of the same grade that will be burned in the appliance. No other material shall be used for testing fuel oil tanks and piping. Tanks shall be filled to maximum capacity for the final check for oil leakage.

§ 1425.060 Appliances.

§ 1425.061 Heat producing appliances.

(a) Heat-producing appliances and vents, roof jacks and chimneys necessary for their installation in mobile homes shall be listed or certified by a nationally recognized testing agency for use in mobile homes.

(1) A mobile home shall be provided with a comfort heating system. (i) When a mobile home is manufactured to contain a heating appliance, the heating appliance shall be installed by the manufacturer of the mobile home in compliance with applicable sections of this subpart. (ii) When a mobile home is manufactured for field application of an external heating or combination heating/cooling appliance, the appliance will not be installed by the manufacturer of the mobile home but preparation of the mobile home for this external application shall comply with the applicable Sections of this Subpart.

(2) Gas and oil burning comfort heating appliances shall have a flue loss of not more than that specified in the Table below, and a thermal efficiency of not less than that specified in nationally recognized standards. (See § 1425.030).

Effective date:	*Maximum allowable flue loss (In percent)*
Jan. 1, 1977	25
Jan. 1, 1976	30

(b) Fuel-burning heat-producing appliances and refrigeration appliances, except ranges and ovens, shall be of the vented type and vented to the outside.

(c) Fuel-burning appliances shall not be converted from one fuel to another fuel unless converted in accordance with the terms of their listing and the appliance manufacturer's instructions.

(d) Electric motor-driven unitary cooling systems shall be listed to comply with all the requirements of the Standard for Unitary Air-Conditioning Equipment (ARI Standard 210-74).

(1) Electric motor-driven unitary cooling systems under 65,000 Btu/hr manufactured after the times indicated in the following Table, when rated at ARI Standard rating conditions as listed in ARI Standard 210-74, shall show energy efficiency ratio (EER) values not less than as shown below:

Effective date:	*Energy efficiency ratio*
Jan. 1, 1977	6.5
Jan. 1, 1980	7.2

(e) Heat pumps shall be listed in the ARI Directory of Certified Unitary Heat Pumps or certified to comply with all the requirements of the Standard for Unitary Heat Pumps ARI 240-74. Electric motor-driven vapor compression heat pumps with supplemental electrical resistance heat shall be sized to provide by compression at least 60 percent of the calculated heating requirement for the mobile home being served. A control shall be provided and set to prevent operation of supplemental electrical resistance heat at outdoor temperatures above 40°F, except for defrost operation.

(1) Electric motor-driven vapor compression heat pumps with supplemental electric resistance heat conforming to ARI Standard 240-74 manufactured after the times indicated in the Table show coefficient of performance ratios not less than shown below:

COP

Date	Outdoor air temperature		
	45° F	20° F	0° F
Jan. 1, 1977	2.2	1.4	Permit shutoff.
Jan. 1, 1980	2.5	1.7	1.0.

(f) Performance Efficiency.

(1) All automatic electric storage water heaters shall have a standby loss not exceeding 43 watts/meter^2 (4 watts/FT^2) of tank surface area effective January 1, 1977. The method of test for standby loss shall be as described in Section 4.3.1 of ANSI C72.1-72.

(2) All gas and oil-fired automatic storage water heaters shall have by January 1, 1977, a recovery efficiency, E_r, and a standby test of E_r and S shall be as described in Section 2.7 of ANSI Z21.10.1-1974 except that for oil-fired units, CF=1.0, Q=total gallons of oil consumed and H=total heating value of oil in BTU/gallon.

Storage capacity in gallons	Recovery efficiency	Standby loss
Less than 25	At least 75 percent.	Not more than 7.5 percent.
25 up to 35	do	Not more than 7 percent.
35 or more	do	Not more than 6 percent.

(g) Each space heating, cooling or combination heating and cooling system shall be provided with at least one readily adjustable automatic control for regulation of interior temperature. The control shall be placed a minimum of 3 feet from the vertical edge of the appliance compartment door. It shall not be located on an exterior wall or on a wall separating the appliance compartment from a habitable room.

§ 1425.062 Clothes dryers.

(a) *Gas Clothes Dryers.* (1) Gas clothes dryers shall be exhausted to the outside by a moisture-lint exhaust duct and termination fitting listed or certified as components of the dryer.

(2) A clothes dryer moisture-lint exhaust duct shall not be connected to any other duct, vent or chimney.

(3) The exhaust duct shall not terminate beneath the mobile home.

(4) Moisture-lint exhaust ducts shall not be connected with sheet metal screws or other fastening devices which extend into the interior of the duct.

(5) Gas Clothes Dryer Stub in Requirements. A mobile home may be provided with "stubbed in" equipment at the factory to supply a gas clothes dryer for future installation by the owner pro-

vided it complies with the following provisions: (i) The "stubbed in" gas outlet shall be provided with a shutoff valve, the outlet of which is closed by threaded pipe plug or cap. (ii) The "stubbed in" gas outlet shall be permanently labeled to identify it for use only as the supply connection for a gas clothes dryer. (iii) A moisture-lint exhaust duct system shall be roughed in by the manufacturer at the time of original installation. The moisture-lint exhaust system shall comply with provisions of § 1425.062(a)(1) through (4).

(b) *Electric Clothes Dryers.* Electric clothes dryers shall be exhausted to the outside in accordance with the appliance manufacturer's instructions. When a receptacle is installed to supply an electric clothes dryer for future installation by the owner, the moisture-lint exhaust system required by § 1425.062(a)(5)(iii) shall be roughed in. Clothes dryers shall not be vented through the floor of the mobile home.

§ 1425.063 Installation of appliances.

(a) The installation of each appliance shall conform to the terms of its listing and the manufacturer's instructions. The installer shall leave the manufacturer's instructions attached to the appliance. Every appliance shall be secured in place to avoid displacement.

(b) Heat-producing appliances shall be so located that no doors, drapes, or other such material can be placed or swing closer to the front of the appliance than the clearances specified on the labeled appliances.

(c) Clearances between heat-producing appliances and adjacent surfaces shall not be less than specified in the terms of their listing. Clearance spaces shall be framed in or guarded to prevent creation of storage space within the clearance specified.

(d) All fuel-burning appliances, except ranges, ovens, illuminating appliances, clothes dryers, solid fuel-burning fireplaces and solid fuel-burning fireplace stoves, shall be installed to provide for the complete separation of the combustion system from the interior atmosphere of the mobile home. Combustion air inlets and flue gas outlets shall be listed or certified as components of the appliance. The required separation may be obtained by:

(1) The installation of direct vent system (sealed combustion system) appliances, or

(2) The installation of appliances within enclosures so as to separate the appliance combustion system and venting system from the interior atmosphere of the mobile home. There shall not be any door, removable access panel, or other opening into the enclosure from the inside of the mobile home. Any opening for ducts, piping, wiring, etc., shall be sealed.

(e) A forced air appliance and its return-air system shall be designed and installed so that negative pressure created by the air-circulating fan cannot affect its or another appliance's combustion air supply or act to mix products of combustion with circulating air.

(1) The air circulating fan of a furnace installed in an enclosure with another fuel-burning appliance shall be operable only when any door or panel covering an opening in the furnace fan compartment or in a return air plenum or duct is in the closed position. This does not apply if both appliances are direct vent system (sealed combustion system) appliances.

(2) If a warm air appliance is installed within an enclosure to conform to § 1425.063(d)(2), each warm-air outlet and each return air inlet shall extend to the exterior of the enclosure. Ducts, if used for that purpose, shall not have any opening within the enclosure and shall terminate at a location exterior to the enclosure.

(3) Cooling coils installed as a portion of, or in connection with, any forced-air furnace shall be installed on the downstream side unless the furnace is specifically otherwise listed.

(4) A cooling coil shall not be located in the air discharge duct or plenum of any forced-air furnace unless such furnace is listed for use with a cooling coil or listed for operation at not less than 0.5 inch water column external static pressure.

(5) If a cooling coil is installed within a forced-air furnace, the coil shall be listed for use with that furnace in the manner so installed or be approved for such use.

(6) When an external heating appliance or combination cooling/heating appliance is to be applied to a mobile home, the manufacturer shall make provision for proper connection to the mobile home supply system and return air system of the external ducts connected to the appliance.

(7) The installation of a self contained air conditioner comfort cooling appliance shall meet the following requirements: (i) The installation on a duct common with an installed heating appliance shall require the installation of an automatic damper or other means to prevent the cooled air from passing through the heating appliance unless the heating appliance is certified or listed for such application and the supply system is intended for such an application. (ii) The installation shall prevent the flow of heated air into the external cooling appliance and its connecting ducts to the mobile home supply and return air system during the operation of the heating appliance installed in the mobile home. (iii) The installation shall prevent simultaneous operation of the heating and cooling appliances.

(f) Vertical Clearance Above Cooking Top. Ranges shall have a vertical clearance above the cooking top of not less than 24 inches. (See § 1422.040)

(g) Solid fuel-burning factory-built fireplaces and fireplace stoves listed for use in mobile homes may be installed in mobile homes provided they and their installation conform to the following paragraphs. A fireplace or fireplace stove shall not be considered as a heating facility for determining compliance with Subpart D of this part.

(1) A solid fuel-burning fireplace or fireplace stove shall be equipped with integral door(s) or shutter(s) designed to close the fireplace or fireplace stove fire chamber opening and shall include complete means for venting through the roof, a combustion air inlet, a hearth extension, and means to securely attach the fireplace or the fireplace stove to the mobile home structure. The installation shall conform to the following subdivisions (i) to (viii) of this subparagraph inclusive: (i) A listed factory-built chimney designed to be attached directly to the fireplace or fireplace stove shall be used. The chimney or the flue gas outlet of the fireplace or fireplace stove shall not include a damper. (ii) A fireplace or fireplace stove, air intake assembly, hearth extension and the chimney shall be installed in accordance with the terms of their listings and their manufacturer's instructions. (iii) The combustion air inlet shall conduct the air directly into the fire chamber and shall be designed to prevent material from the hearth dropping onto the area beneath the mobile home. The air inlet shall not include a damper or other means of closure. (iv) The fireplace or fireplace stove shall not be installed in a sleeping room. (v) Hearth extension shall be of noncombustible material not less than ⅜-inch thick. The hearth shall extend at least 16 inches in front of and at least 8 inches beyond each side of the fireplace or fireplace stove opening. Furthermore the hearth shall extend over the entire surface beneath a fireplace stove and beneath an elevated or overhanging fireplace. (vi) The label on each solid fuel-burning fireplace and solid fuel-burning fireplace stove shall include the following wording: FOR USE WITH SOLID FUEL ONLY. (vii) The chimney shall be provided with a spark arrester securely attached to the chimney. The net free area of the arrester shall be not less than four times the net area of the chimney outlet and the vertical height of the arrester shall be not less than 1.3 times the diameter of the chimney flue. Openings shall not permit the passage of a sphere having a diameter larger than ½ inch, nor block the passage of a sphere having a diameter of less than ⅜ inch. (viii) The chimney shall extend at least three feet above the part of the roof through which it passes and at least two feet above the highest elevation of any part of the mobile home within 10 feet of the chimney. Portions of the chimney and termination that exceed an elevation of 13½ ft. above ground level may be designed to be removed for transporting the mobile home.

§ 1425.064 Venting, ventilation and combustion air.

(a) The venting as required by § 1425.061(b) shall be accomplished by one or more of the methods given in subparagraphs (1) and (2) of this paragraph:

(1) An integral vent system listed or certified as part of the appliance.

(2) A venting system consisting entirely of listed components, including roof jack, installed in accordance with the

terms of the appliance listing and the appliance manufacturer's instructions.

(b) Venting and combustion air systems shall be installed in accordance with the following:

(1) Components shall be securely assembled and properly aligned using the method shown in the appliance manufacturer's instructions.

(2) Draft hood connectors shall be firmly attached to draft hood outlets or flue collars by sheet metal screws or by equivalent effective mechanical fasteners.

(3) Every joint of a vent, vent connector, exhaust duct and combustion air intake shall be secure and in alignment.

(c) Venting systems shall not terminate underneath a mobile home.

(d) Venting system terminations shall be not less than three feet from any motor-driven air intake discharging into habitable areas.

(e) The area in which cooking appliances are located shall be ventilated by a metal duct which may be single wall, not less than 12.5 square inches in cross-sectional area (minimum dimension shall be two inches) located above the appliance(s) and terminating outside the mobile home, or by listed mechanical ventilating equipment discharging outside the home, that is installed in accordance with the terms of listing and the manufacturer's instructions. Gravity or mechanical ventilation shall be installed within a horizontal distance of not more than ten feet from the vertical front of the appliance(s).

§ 1425.065 Instructions.

Operating instructions shall be provided with each appliance. These instructions shall include directions and information covering the proper use and efficient operation of the appliance and its proper maintenance.

§ 1425.066 Marking.

(a) Information on clearances, input rating, lighting and shutdown shall be attached to the appliances with the same permanence as the nameplate, and so located that it is easily readable when the appliance is properly installed.

(b) Each fuel-burning appliance shall bear permanent marking designating the type(s) of fuel for which it is listed.

§ 1425.067 Accessibility.

Every appliance shall be accessible for inspection, service, repair, and replacement without removing permanent construction. Sufficient room shall be available to enable the operator to observe the burner, control, and ignition means while starting the appliance.

§ 1525.068 Appliances, cooling.

(a) Every air conditioning unit or a combination air conditioning and heating unit shall be listed or certified by a nationally recognized testing laboratory for the application for which the unit is intended and installed in accordance with the terms of its listing.

(1) Mechanical air conditioners shall be rated in accordance with the Standard for Unitary Air-Conditioning Equipment (ARI Standard 210-74) and certified by ARI or other nationally recognized testing agency capable of providing follow-up service. (i) Electric motordriven unitary cooling systems under 65,000 BTU/hr manufactured after the times indicated in the following table, when rated at ARI Standard rating conditions as listed in ARI Standard 210-74, shall show energy efficiency ratio (EER) values not less than as shown below:

Date:	Energy efficiency ratio
Jan. 1, 1977	6.5
Jan. 1, 1980	7.2

(ii) Direct refrigerating systems serving any air conditioning or comfort-cooling system installed that ranks no lower than Group 5 in the Underwriters' Laboratories, Inc. "Classification of Comparative Life Hazard of Various Chemicals." (iii) Heat pumps shall be listed in the ARI Directory of Certified Unitary Heat Pumps or certified to comply with all the requirements of the Standard for Unitary Heat Pumps 240-74. Electric motor-driven vapor compression heat pumps with supplemental electrical resistance heat shall be sized to provide by compression at least 60 percent of the calculated heating requirements for the mobile home being served. A control shall be provided and set to prevent operation of supplemental electrical resistance heat at outdoor temperatures above 40° F, except for defrost operation. (iv) Electric motor-driven vapor compression heat pumps with supplemental electric resistance heat conforming to ARI Standard 240-74 manufactured after the times indicated in the table shall show coefficient of performance ratios not less than shown below:

COP

Date	Outdoor air temperature		
	45° F	20° F	0° F
Jan. 1, 1977	2.2	1.4	Permit shutoff.
Jan. 1, 1980	2.5	1.7	1.0.

(2) Gas fired absorption air conditioners shall be rated in accordance with ANSI Standard Z21.40.1-1973 and certified by AGA or another nationally recognized testing agency capable of providing follow-up service.

(3) Direct refrigerating systems serving any air conditioning or comfort-cooling system installed in a mobile home shall employ a type of refrigerant that ranks no lower than Group 5 in the Underwriters' Laboratories, Inc. "Classification of Comparative Life Hazard of Various Chemicals."

(b) Installation and Instructions.

(1) The installation of each appliance shall conform to the terms of its listing as specified on the appliance and in the manufacturer's instructions. The installer shall include the manufacturer's installation instructions in the mobile home. Appliances shall be secured in place to avoid displacement and movement from vibration and road shock.

(2) Operating instructions shall be provided with the appliance.

(c) Any air conditioner using combustible fuel for the power source shall comply with § 1425.061.

(d) The rating plate conforming to the listing agency's requirements shall be so located that it is easily readable when the appliance is properly installed.

(e) Every appliance shall be accessible for inspection, service, repair and replacement without removing permanent construction.

§ 1425.069 Circulating air system.

(a) *Supply System*. (1) Supply ducts and any dampers contained therein shall be made from galvanized steel, tin-plated steel, or aluminum, or shall be listed Class 0, Class 1, or Class 2 air ducts. Class 2 air ducts shall be located at least 3 feet from the furnace bonnet or plenum. A duct system integral with the structure shall be of durable construction that can be demonstrated to be equally resistant to fire and deterioration. Ducts constructed from sheet metal shall be in accordance with the following Table.

Minimum metal thickness for ducts[1]

Duct type	Diameter or 14 in or less	Width over 14 in
Round	0.013	0.016
Enclosed rectangular	.013	.016
Exposed rectangular	.016	.019

[1] When "nominal" thicknesses are specified, 0.003 in shall be added to these "minimum" metal thicknesses.

(2) Sizing of Ducts for Heating. (i) Ducts shall be so designed that when a labeled forced-air furnace is installed and operated continuously at its normal heating air circulator rate in the mobile home, with all registers in the full open position, a static pressure measured in the casing (for upflow furnaces the static pressure shall be taken in the duct plenum; for external heating or combination heating/cooling appliances the static pressure shall be taken at the point used by the agency listing or certifying the appliance) shall not exceed 90% of that shown on the label of the appliance. (ii) When an evaporator-coil specifically designed for the particular furnace is installed between the furnace and the duct plenum, the total static pressure shall be measured downstream of the coil in accordance with the appliance label and shall not exceed 90% of the listed label. (iii) When any other listed evaporator coil is installed between the furnace and the duct plenum, the total static pressure shall be measured between the furnace and the coil and it shall not exceed 90% of that shown on the label of the furnace. (iv) The minimum dimension of any branch duct shall be at least 1½ inches, and of any main duct, 2½ inches.

(3) Sizing of Ducts for Air Cooling. (i) The mobile home manufacturer shall certify the capacity of the air cooling supply duct system for the maximum allowable output of ARI certified Mobile Home Central Air Conditioning Systems. (See Subpart D of this part). (ii) The refrigerated air cooling supply duct system including registers must be capable

of handling at least 300 CFM per 10,000 BTUH with a static pressure no greater than 0.3 inches of water. In the case of application of external self contained comfort cooling appliances or the cooling operation sequence of combination heating/cooling appliances, the external duct between the appliance and the mobile home supply system shall be considered part of the refrigerated air cooling supply duct system or the connecting duct between the external appliance and the mobile supply duct system shall be a part of the listed appliance. The Minimum dimension of any branch duct shall be at least 1½ inches, and of any main duct, 2½ inches.

(4) Airtightness of Supply Duct Systems. A supply duct system shall be considered substantially airtight when the static pressure in the duct system, with all registers sealed and with the furnace air circulator at high speed, is at least 80 percent of the static pressure measured in the furnace casing, with its outlets sealed and the furnace air circulator operating at high speed. For the purpose of this paragraph and § 1425.069(b) pressures shall be measured with a water manometer or equivalent device calibrated to read in increments not greater than $\frac{1}{16}$ inch water column.

(5) Expandable or Multiple Home Connections: (i) An expandable or multiple mobile home may have ducts of the heating system installed in the various units. The points of connection must be so designed and constructed that when the mobile home is fully expanded or coupled, the resulting duct joint will conform to the requirements of this part. (ii) Installation instructions for supporting the crossover duct from the mobile home shall be provided for onsite installation. The duct shall not be in contact with the ground.

(6) Air supply ducts shall be insulated with material having an effective thermal resistance (R) of not less than 4.0 unless they are within mobile home insulation having a minimum effective value of R–4.0 for floors or R–6.0 for ceilings.

(7) Supply and return ducts exposed directly to outside air, such as under chassis crossover ducts or ducts connecting external heating, cooling or combination heating/cooling appliances shall be insulated with material having a minimum thermal resistance of R=4.0, with a continuous vapor barrier having a perm rating of not more than 1 perm. Where exposed underneath the mobile home, all such ducts shall comply with § 1425.069 (a) (4) (ii).

(b) *Return Air Systems*—(1) *Return Air Openings*. Provisions shall be made to permit the return of circulating air from all rooms and living spaces, except toilet room(s), to the circulating air supply inlet of the furnace.

(2) *Duct Material*. Return ducts and any diverting dampers contained therein shall be in accordance with the following: (i) Portions of return ducts directly above the heating surfaces, or closer than 2 feet from the outer jacket or casing of the furnace shall be constructed of metal in accordance with § 1425.069 (a) (1) or shall be listed Class 0 or Class 1 air ducts. (ii) Return ducts, except as required by (a) above, shall be constructed of one-inch (nominal) wood boards (flame spread classification of not more than 200), other suitable material no more flammable than one-inch board or in accordance with § 1425.069(a) (1). (iii) The interior of combustible ducts shall be lined with noncombustible material at points where there might be danger from incandescent particles dropped through the register or furnace such as directly under floor registers and the bottom return. (iv) Factory made air ducts used for connecting external heating, cooling or combination heating/cooling appliances to the supply system and return air system of a mobile home shall be listed by a nationally recognized approval agency. Ducts applied to external heating appliances or combination heating/cooling appliances supply system outlets shall be constructed of metal in accordance with § 1425.069(a) (1) or shall be listed Class 0 or Class 1 air ducts for those portions of the duct closer than 2 feet from the outer casing of the appliance. (v) Ducts applied to external appliances shall be resistant to the deterioration effects of ultra violet rays, cold weather, moisture and shall be rodent proof.

(3) *Sizing*. The cross-sectional areas of the return air duct shall not be less than 2 square inches for each 1,000 btu per hour input rating of the appliance. Dampers shall not be placed in a combination fresh air intake and return air duct so arranged that the required cross-sectional area will not be reduced at all possible positions of the damper.

(4) *Permanent Unclosable Openings*. Living areas not served by return air ducts or closed off from the return opening of the furnace by doors, sliding partitions, or other means shall be provided with permanent unclosable openings in the doors or separating partitions to allow circulated air to return to the furnace. Such openings may be grilled or louvered. The net free area of each opening shall be not less than 1 square inch for every 5 square feet of total living area closed off from the furnace by the door or partition serviced by that opening. Undercutting doors connecting the closed-off space may be used as a means of providing return air area. However, in the event that doors are undercut, they shall be undercut a minimum of 2 inches and no more than 2½ inches, and no more than one half of the free air area so provided shall be counted as return air area.

(c) *Joints and Seams*. Joints and seams of ducts shall be securely fastened and made substantially airtight. Slip joints shall have a lap of at least 1 inch and shall be individually fastened. Tape or caulking compound may be used for sealing mechanically secure joints. Where used, tape or caulking compound shall not be subject to deterioration under long exposures to temperatures up to 200°F and to conditions of high humidity, excessive moisture, or mildew.

(d) *Supports*. Ducts shall be securely supported.

(e) *Registers or Grilles*. Fittings connecting the registers or grilles to the duct system shall be constructed of metal or material which complies with the requirements of Class 1 or 2 ducts under Underwriters' Laboratories, Inc. Standard for Air Ducts, UL181–1972. Air supply terminal devices when installed in kitchens, bedrooms and bathrooms shall be equipped with adjustable closeable dampers. Registers or grilles shall be constructed of metal or conform with the following:

(1) Be made of a material classified 94VE–0 or 94VE–1 when tested as described in Underwriters' Laboratories, Inc. Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Applicances. UL94–1974.

(2) Floor register or grilles shall resist without structural failure a 20 lb. concentrated load on a 2-inch diameter disc applied to the most critical area of the exposed face of the register or grille. For this test the register or grille is to be at a temperature of not less than 165° F and is to be supported in accordance with the manufacturer's instructions.

Subpart G—Electrical Systems

§ 1426.010 Scope.

(a) This Subpart G of this Standard and Part A of Article 550 of the National Electrical Code (NFPA No. 70—1975) cover the electrical conductors and equipment installed within or on mobile homes and the conductors that connect mobile homes to a supply of electricity.

(b) The provisions of this Standard apply to mobile homes intended for connection to a wiring system nominally rated 115/230 volts, 3-wire AC, with grounded neutral.

(c) In addition to the requirements of this Standard and Article 550 of the National Electrical Code (NFPA No. 70—1975), the applicable portions of other Articles of the National Electrical Code shall be followed covering electrical installations in mobile homes. Wherever the requirements of this Standard differ from Articles other than Article 550 of the National Electrical Code, this Standard and Article 550 shall apply.

§ 1426.020 Definitions.

(a) The following definitions are applicable to § 1426.000 only.

(1) "Accessible (i) (As Applied to Equipment)" means admitting close approach because not guarded by locked doors, elevation, or other effective means. (See "Readily Accessible.") (ii) "(As Applied to Wiring Methods)" means capable of being removed or exposed without damaging the mobile home structure or finish, or not permanently closed-in by the structure or finish of the mobile home (see "Concealed" and "Exposed").

(2) "Air Conditioning or Comfort Cooling Equipment" means all of that

equipment intended or installed for the purpose of processing the treatment of air so as to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space.

(3) (i) "Appliance" means utilization equipment, generally other than industrial, normally built in standardized sizes or types, which is installed or connected as a unit to perform one or more functions, such as clothes washing, air conditioning, food mixing, deep frying, etc. (ii) "Appliance, Fixed" an appliance which is fastened or otherwise secured at a specific location. (iii) "Appliance, Portable" means an appliance which is actually moved or can easily be moved from one place to another in normal use. For the purpose of this Standard, the following major appliances are considered portable if cord-connected: refrigerators, clothes washers, dishwashers without booster heaters, or other similar appliances. (iv) "Appliance, Stationary" means an appliance which is not easily moved from one place to another in normal use.

(4) "Attachment Plug (Plug Cap) (Cap)" means a device which, by insertion in a receptacle, establishes connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle.

(5) "Bonding" means the permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct safely any current likely to be imposed.

(6) "Branch Circuit" (1) means the circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). A device not approved for branch circuit protection, such as a thermal cutout or motor overload protective device, is not considered as the overcurrent device protecting the circuit. (ii) "Branch Circuit—Appliance" means a branch circuit supplying energy to one or more outlets to which appliances are to be connected; such circuits to have no permanently connected lighting fixtures not a part of an appliance. (iii) "Branch Circuit—General Purpose" means a circuit that supplies a number of outlets for lighting and appliances. (iv) "Branch Circuit—Individual" means a branch circuit that supplies only one utilization equipment.

(7) "Cabinet" means an enclosure designed either for surface or flush mounting, and provided with a frame, mat, or trim in which swinging doors are hung.

(8) "Circuit Breaker" means a device designed to open and close a circuit by nonautomatic means, and to open the circuit automatically on a predetermined overload or current without injury to itself when properly applied within its rating.

(9) "Concealed" means rendered inaccessible by the structure or finish of the mobile home. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them. (See "Accessible (As Applied to Wiring Methods)".)

(10) "Connector, Pressure (Solderless)" means a device that establishes a connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder.

(11) "Dead Front (As Applied to Switches, Circuit-Breakers, Switchboards, and Distribution Panelboard)" means so designed, constructed, and installed that no current-carrying parts are normally exposed on the front.

(12) "Demand Factor" means the ratio of the maximum demand of a system, or part of a system, to the total connected load of a system or the part of the system under consideration.

(13) "Device" means a unit of an electrical system that is intended to carry but not utilize electrical energy.

(14) "Disconnecting Means" means a device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

(15) "Distribution Panelboard" means a single panel or a group of panel units designed for assembly in the form of a single panel, including buses, and with or without switches or automatic overcurrent protective devices or both, for the control of light, heat, or power circuits of small individual as well as aggregate capacity; designed to be placed in a cabinet placed in or against a wall or partition and accessible only from the front.

(16) "Enclosed" means surrounded by a case that will prevent a person from accidently contacting live parts.

(17) "Equipment" means a general term, including material, fittings, devices, appliances, fixtures, apparatus, and the like used as a part of, or in connection with, an electrical installation.

(18) "Exposed" (i) (As Applied to Live Parts) means capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated. (See "Accessible" and "Concealed.") (ii) (As Applied to Wiring Method)" means on or attached to the surface or behind panels designed to allow access. (See "Accessible (As Applied to Wiring Methods)")

(19) "Externally Operable" means capable of being operated without exposing the operator to contact with live parts.

(20) "Feeder Assembly" means the overhead or under-chassis feeder conductors, including the grounding conductor, together with the necessary fittings and equipment, or a power supply cord approved for mobile home use, designed for the purpose of delivering energy from the source of electrical supply to the distribution panelboard within the mobile home.

(21) "Fitting" means an accessory, such as a locknut, bushing, or other part of a wiring system, that is intended primarily to perform a mechanical rather than an electrical function.

(22) "Ground" means a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body that serves in place of the earth.

(23) "Grounded" means connected to earth or to some conducting body that serves in place of the earth.

(24) "Grounded Conductor" means a system or circuit conductor that is intentionally grounded.

(25) "Grounding Conductor" means a conductor used to connect equipment or the grounded circuit of a writing system to a grounding electrode or electrodes.

(26) "Guarded" means covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats or platforms to remove the likehihood of approach or contact by persons or objects to a point of danger.

(27) "Isolated" means not readily accessible to persons unless special means for access are used.

(28) "Laundry Area" means an area containing or designed to contain either a laundry tray, clothes washer and/or clothes dryer.

(29) "Lighting Outlet" means an outlet intended for the direct connection of a lampholder, a lighting fixture, or a pendant cord terminating in a lampholder.

(30) "Mobile Home Accessory Building or Structure" means any awning, cabana, ramada, storage cabinet, carport, fence, windbreak or porch established for the use of the occupant of the mobile home upon a mobile home lot.

(31) "Mobile Home Service Equipment" means the equipment containing the disconnecting means, overcurrent protective devices, and receptacles or other means for connecting a mobile home feeder assembly.

(32) "Outlet" means a point on the wiring system at which current is taken to supply utilization equipment.

(33) "Panelboard" means a single panel or group of panel units designed for assembly in the form of a single panel; including buses, automatic overcurrent protective devices, and with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall or partition and accessible only from the front.

(34) "Raceway" means any channel for holding wires, cables, or busbars that is designed expressly for, and used solely for, this purpose. Raceways may be of metal or insulating material, and the term includes rigid metal conduit, rigid nonmetallic conduit, flexible metal conduit, electrical metallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, structural raceways, wireways, and busways.

(35) "Raintight" means so constructed or protected that exposure to a beating rain will not result in the entrance of water.

(36) "Readily Accessible" means capable of being reached quickly for operation, renewal, or inspection, without requiring those to whom ready access is requisite to climb over or remove ob-

stacles or to resort to portable ladders, chairs, etc. (See "Accessible.")

(37) "Receptacle" means a contact device installed at an outlet for the connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles.

(38) "Receptacle Outlet" means an outlet where one or more receptacles are installed.

(39) "Utilization Equipment" means equipment which utilizes electric energy for mechanical, chemical, heating, lighting, or similar purposes.

(40) "Voltage (of a Circuit)" means the greatest root-mean-square (effective) difference of potential between any two conductors of the circuit concerned. Some systems, such as 3-phase 4-wire, single-phase 3 wire, and 3-wire direct-current may have various circuits of various voltages.

(41) "Weatherproof" means so constructed or protected that exposure to the weather will not interfere with successful operation. Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

§ 1426.030 Power supply.

(a) The power supply to the mobile home shall be a feeder assembly consisting of not more than one listed 50 ampere mobile home power-supply cords, or a permanently installed circuit. A mobile home that is factory-equipped with gas or oil-fired central heating equipment and cooking appliances shall be permitted to be provided with a listed mobile home power-supply cord rated 40 amperes.

(b) If the mobile home has a power-supply cord, it shall be permanently attached to the distribution panelboard or to a junction box permanently connected to the distribution panelboard, with the free end terminating in an attachment plug cap.

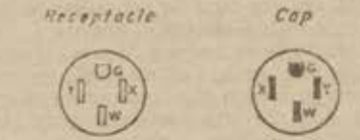
(c) Cords with adapters and pigtail ends extension cords, and similar items shall not be attached to, or shipped with, a mobile home.

(d) A suitable clamp or the equivalent shall be provided at the distribution panelboard knockout to afford strain relief for the cord to prevent strain from being transmitted to the terminals when the power-supply cord is handled in its intended manner.

(e) The cord shall be of an approved type with four conductors, one of which shall be identified by a continuous green color or a continuous green color with one or more yellow stripes for use as the grounding conductor.

(f) The attachment plug cap shall be a 3-pole, 4-wire grounding type, rated 50 amperes, 125/250 volts with a configuration as shown herein and intended for use with the 50-ampere, 125/250 receptacle configuration shown. It shall be molded of butyl rubber, neoprene, or other approved materials which have been suitable for the purpose, and shall be molded to the flexible cord so that it adheres tightly to the cord at the point where the cord enters the attachment-plug cap. If a right-angle cap is used, the configuration shall be so oriented that the grounding member is farthest from the cord.

(g) The overall length of a power-supply cord, measured from the end of the cord, including bared leads, to the face of the attachment-plug cap shall not be less than 21 feet and shall not exceed 36½ feet. The length of cord from the face of the attachment-plug cap to the point where the cord enters the mobile home shall not be less than 20 feet.



50-ampere 125/250 volt receptacle and attachment-plug-cap configurations, 3 pole, 4-wire grounding types used for mobile home supply cords and mobile home parks. Complete details of the 50-ampere cap and receptacle can be found in the American National Standard Dimensions of Caps, Plugs and Receptacles, Grounding Type (ANSI C73.17—1972).

(h) The power-supply cord shall bear the following marking: "For use with mobile homes—40 amperes" or "For use with mobile homes—50 amperes."

(i) The point of entrance of the feeder assembly to the mobile home shall be in the exterior wall, floor, or roof, in the rear third section (away from the coupler), of the mobile home.

(j) Where the cord passes through walls or floors, it shall be protected by means of conduit and bushings or equivalent. The cord may be installed within the mobile home walls, provided a continuous raceway is installed from the branch-circuit panelboard to the underside of the mobile home floor. The raceway may be rigid conduit, electrical metallic tubing or polyethylene (PE), polyvinylchloride (PVC) or acrylonitrile-butadiene-styrene (ABS) plastic tubing having a minimum wall thickness of nominal ⅛ inch.

(k) Permanent provisions shall be made for the protection of the attachment-plug cap of the cord set and any connector cord assembly or receptable against corrosion and mechanical damage if such devices are in an exterior location while the mobile home is in transit.

(l) Where the calculated load exceeds 50 amperes or where a permanent feeder is used, the supply shall be by means of:

(1) One mast weatherhead installation installed in accordance with Article 230 of the National Electrical Code NFPA No. 70—1975 containing four continuous insulated, color-coded, feeder conductors, one of which shall be an equipment grounding conductor; or,

(2) An approved metal raceway from the disconnecting means in the mobile home to the underside of the mobile home with provisions for the attachment of a suitable junction box or fitting to the raceway on the underside of the mobile home (with or without conductors as in § 1426.030(m)(1)).

§ 1426.040 Disconnecting means and branch-circuit protective equipment.

(a) The branch-circuit equipment shall be permitted to be combined with the disconnecting means as a single assembly. Such a combination shall be permitted to be designated as a distribution panelboard. If a fused distribution panelboard is used, the maximum fuse size of the mains shall be plainly marked with lettering at least ¼-inch high and visible when fuses are changed. See section 110-22 of the National Electrical Code (NFPA No. 70—1975) concerning identification of each disconnecting means and each service, feeder, or branch circuit at the point where it originated and the type marking needed.

(b) Plug fuses and fuseholders shall be tamper-resistant, Type "S," enclosed in dead-front fuse panelboards.

(c) Disconnecting Means. A single disconnecting means shall be provided in each mobile home consisting of a circuit breaker, or a switch and fuses and their accessories installed in a readily accessible location near the point of entrance of the supply cord or conductors into the mobile home. The main circuit breakers or fuses shall be plainly marked "Main." This equipment shall contain a solderless type of grounding connector or bar for the purposes of grounding with sufficient terminals for all grounding conductors. The neutral bar termination of the grounded circuit conductors shall be insulated.

(d) The disconnecting equipment shall have a rating suitable for the connected load. The distribution equipment, either circuit breaker or fused type, shall be located a minimum of 24 inches from the bottom of such equipment to the floor level of the mobile home. The main circuit breakers or switches shall be plainly marked "Main." There shall be a label attached to the panelboard stating: This Panelboard shall be connected by a Feeder Assembly having Overcurrent Protection rated at not more than ____ Amperes. The correct ampere rating shall be marked in the blank space.

(e) A distribution panelboard main circuit breaker shall be rated 50 amperes and employ a 2-pole circuit breaker rated 40 amperes for a 40-ampere supply cord, or 50 amperes for a 50-ampere supply cord. A distribution panelboard employing a disconnect switch and fuses shall be rated 60 amperes and shall employ a single 2-pole, 60-ampere fuseholder with 40- or 50-ampere main fuses for 40- or 50-ampere supply cords, respectively. The outside of the distribution panelboard shall be plainly marked with the fuse size.

(f) The distribution panelboard shall be permitted just inside a closet entry if the location is such that a clear space of 6 inches to easily ignitable materials is maintained in front of the distribution panelboard, and the distribution panelboard door can be extended to its full open position (at least 90 degrees). A clear working space at least 30 inches wide and 30 inches in front of the distribution panelboard shall be provided. This space shall extend from floor to the top of the distribution panelboard.

(g) Branch-circuit distribution equipment shall be installed in each mobile home and shall include overcurrent protection for each branch circuit consisting of either circuit breakers or fuses.

(1) The branch circuit overcurrent devices shall be rated: (i) Not more than the circuit conductors; and (ii) not more than 150 percent of the rating of a single appliance rated 10 amperes or more which is supplied by an individual branch circuit; but (iii) not more than the fuse size marked on the air conditioner or other motor-operated appliance.

(h) A 15-ampere multiple receptacle shall be acceptable when connected to a 20-ampere laundry circuit.

(i) When circuit breakers are provided for branch-circuit protection, 230-volt circuits shall be protected by 2-pole common or companion trip, or handle-tied paired circuit breakers.

(j) A metal nameplace on the outside adjacent to the feeder assembly entrance shall read: This Connection for 120/240 Volt, 3-Pole, 4-Wire, 60 Hertz ____ Ampere Supply. The correct ampere rating shall be marked in the blank space.

§ 1426.050 Branch circuits required.

(a) The number of branch circuits required shall be determined in accordance with the following:

(1) *Lighting*. Based on 3 watts per square foot times outside dimensions of the mobile home (coupler excluded) divided by 115 volts to determine number of 15- or 20-ampere lighting area circuits, e.g.,

$$\frac{3 \text{ x Length x Width}}{115 \text{ x } 15 \text{ (or 20)}} = \text{No. or 15 (or 20) ampere circuits.}$$

(2) *Portable Appliances*. For the small appliance load in kitchen, pantry, family room, dining room and breakfast rooms of mobile homes, two or more 20-ampere appliance branch circuits, in addition to the branch circuit specified in paragraph (a)(1) of this section, shall be provided for all receptacle outlets in these rooms, and such circuits shall have no other outlets. Receptacle outlets supplied by at least two appliance receptacle branch circuits shall be installed in the kitchen.

(3) *General Appliances (Including Furance, Water Heater, Range, and Central or Room Air Conditioner, etc.)*. There shall be one or more circuits of adequate rating in accordance with the following: (i) Ampere rating of fixed appliances not over 50 percent of circuit rating if lighting outlets (receptacles, other than kitchen, dining area, and laundry, considered as lighting outlets) are on same circuit; (ii) For fixed appliances on a circuit without lighting outlets, the sum of rated amperes shall not exceed the branch-circuit rating for other than motor loads or 80 percent of the branch-circuit rating for air conditioning or other motor loads; (iii) The rating of a single portable appliance on a circuit having no more outlets shall not exceed 80 percent of the circuit rating; (iv) The rating of range branch circuit shall be based on the range demand as specified for ranges in § 1426.110, Item B (5) of Method 1. For central air conditioning, see Article 440 of the National Electrical Code (NFPA No. 70—1975). (v) Where laundry facilities are provided in a mobile home, a 20-ampere branch circuit shall be provided within 6 feet of the intended location of the appliance. See § 1426.040(j).

§ 1426.060 Receptacle outlets.

(a) All receptacle outlets shall be:

(1) of grounding type;

(2) installed according to Section 210-7 of the National Electrical Code (NFPA No. 70—1975) and

(3) except when supplying specific appliances, be parallel-blade, 15-ampere, 125-volt, either single or duplex.

(b) All 120 volt single phase, 15 and 20 ampere receptacle outlets installed outdoors and in bathrooms shall have ground-fault circuit protection for personnel. Feeders supplying branch circuits may be protected by a ground-fault circuit-interrupter in lieu of the provision for such interrupters specified above.

(c) There shall be an individual outlet of the grounding type for each cord-connected fixed appliance installed.

(d) Receptacle Outlets Required. Except in the bath and hall areas, receptacle outlets shall be installed at wall spaces 2 feet wide or more, so that no point along the floor line is more than 6 feet, measured horizontally, from an outlet in that space. In addition, a receptacle outlet shall be installed:

(1) Over or adjacent to counter tops in the kitchen (at least one on each side of the sink if counter tops are on each side and 12 inches or over in width).

(2) Adjacent to the refrigerator and free-standing gas-range space.

(3) At counter top spaces for built-in vanities.

(4) At counter top spaces under wall-mounted cabinets.

(5) In the wall, at the nearest point where a bar type counter attaches to the wall.

(6) In the wall at the nearest point where a fixed room divider attaches to the wall.

(7) At least one receptacle outlet shall be installed outdoors. Receptacle outlets located in compartments accessible from outdoors shall be considered outdoor receptacles and shall be protected as required in § 1426.060(b).

(8) Receptacle outlets are not required in the following locations: (i) Wall space occupied by built-in kitchen or wardrobe cabinets, (ii) wall space behind doors which may be opened fully against a wall surface, (iii) room dividers of the lattice type, less than 8 feet long, not solid within 6 inches of the floor, (iv) wall space afforded by bar type counters.

(e) Receptacle outlets shall not be installed in or within reach (30 inches) of a shower or bathtub space.

§ 1426.070 Fixtures and appliances.

(a) Electrical materials, devices, appliances, fittings, and other equipment installed, intended for use in, or attached to the mobile home shall be approved for the application and shall be connected in an approved manner when in service. Facilities shall be provided to securely fasten appliances when the mobile home is in transit. (See § 1426.090.)

(b) Specifically listed pendant-type fixtures or pendant cords shall be permitted in mobile homes.

(c) If a lighting fixture is provided over a bathtub or in a shower stall, it shall be of the enclosed and gasketed type, listed for damp or wet locations.

(d) The switch for shower lighting fixtures and exhaust fans located over a tub or in a shower stall shall be located outside the tub shower space. (See § 1426.000(c).)

(e) Any combustible wall or ceiling finish exposed between the edge of a fixture, canopy, or pan and an outlet box shall be covered with noncombustible material.

(f) Every appliance shall be accessible for inspection, service, repair, or replacement without removal of permanent construction.

§ 1426.080 Wiring methods and materials.

(a) Except as specifically limited in this part, the wiring methods and materials specified in the National Electrical Code (NFPA No. 70—1975) shall be used in mobile homes.

(b) Nonmetallic outlet boxes shall be acceptable only with nonmetallic cable.

(c) Nonmetallic cable located 15 inches or less above the floor, if exposed, shall be protected from physical damage by covering boards, guard strips, or conduit. Cable likely to be damaged by stowage shall be so protected in all cases.

(d) Nonmetallic sheathed cable shall be secured by staples, straps, or similar fittings so designed and installed as not to injure any cable. Cable shall be secured in place at intervals not exceeding 4½ feet and within 12 inches from every cabinet, box or fitting.

(e) Metal-clad and nonmetallic cables shall be permitted to pass through the centers of the wide side of 2-inch by 4-inch studs. However, they shall be protected where they pass through 2-inch by 2-inch studs or at other studs or frames where the cable or armor would be less than 1½ inches from the inside or outside surface. Steel plates on each side of the cable, or a tube, with not less than No. 16 MSG wall thickness shall be required to protect the cable. These plates or tubes shall be securely held in place.

(f) Where metallic faceplates are used they shall be effectively grounded.

(g) If the range, clothes dryer, or similar appliance is connected by metal-clad cable or flexible conduit, a length of not less than three feet of free cable or conduit shall be provided to permit moving the appliance. Type NM or Type SE cable shall not be used to connect a range or a dryer. This shall not prohibit the use of Type NM or Type SE cable between the branch circuit overcurrent protective device and a junction box or range or dryer receptacle.

(h) Threaded rigid metal conduit shall be provided with a locknut inside and outside the box, and a conduit bushing shall be used on the inside. Rigid nonmetallic conduit shall be permitted. Inside ends of the conduit shall be reamed.

(i) Switches shall be rated as follows:

(1) For lighting circuits, switches shall have a 10-ampere, 120–125 volt rating; or higher if needed for the connected load.

(2) For motors or other loads, switches shall have ampere or horsepower ratings, or both, adequate for loads controlled. (An "AC general-use" snap switch shall be permitted to control a motor 2 horsepower or less with full-load current not over 80 percent of the switch ampere rating).

(j) At least 4 inches of free conductor shall be left at each outlet box except where conductors are intended to loop without joints.

(k) When outdoor or under-chassis line-voltage wiring is exposed to moisture or physical damage, it shall be protected by rigid metal conduit. The conductors shall be suitable for wet locations. Electrical metallic tubing may be used when closely routed against frames and equipment enclosures.

(l) The cables or conductors shall be Type NMC, TW, or equivalent.

(m) Outlet boxes of dimensions less than those required in Table 370–6(a) of the National Electrical Code (NFPA No. 70—1975), shall be permitted provided the box has been tested and approved for the purpose.

(n) Boxes, fittings and cabinets shall be securely fastened in place, and shall be supported from a structural member of the home, either directly or by using a substantial brace. Snap-in type boxes provided with special wall or ceiling brackets that securely fasten boxes in walls or ceilings shall be permitted.

(o) Outlet boxes shall fit closely to openings in combustible walls and ceilings, and they shall be flush with such surfaces.

(p) Appliances having branch-circuit terminal connections which operate at temperatures higher than 60°C (140°F) shall have circuit conductors as described in subparagraphs (1) and (2) of this paragraph:

(1) Branch-circuit conductors having an insulation suitable for the temperature encountered shall be permitted to turn directly to the appliance.

(2) Conductors having an insulation suitable for the temperature encountered shall be run from the appliance terminal connections to a readily accessible outlet box placed at least one foot from the appliance. These conductors shall be in a suitable raceway which shall extend for at least 4 feet.

§ 1426.090 Grounding.

(a) *General.* Grounding of both electrical and nonelectrical metal parts in a mobile home shall be through connection to a grounding bus in the mobile home distribution panelboard. The grounding bus shall be grounded through the green-colored conductor in the supply cord or the feeder wiring to the service ground and the service-entrance equipment located adjacent to the mobile home location. Neither the frame of the mobile home nor the frame of any appliance shall be connected to the neutral conductor in the mobile home.

(b) *Insulated Neutral.* (1) The grounded circuit conductor (neutral) shall be insulated from the grounding conductors and from equipment enclosures and other grounded parts. The grounded (neutral) circuit terminals in the distribution panelboard and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens shall be insulated from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances shall be removed and discarded.

(2) Connection of ranges and clothes dryers with 115/230-volt, 3-wire ratings shall be made with 4-conductor cord and 3-pole, 4-wire grounding type plugs, or by Type AC metal-clad cable or conductors enclosed in flexible metal conduit. For 115-volt rated devices, a 3-conductor cord and a 2-pole, 3-wire grounding-type shall be permitted.

(c) *Equipment Grounding Means.* (1) The green-colored grounding wire in the supply cord or permanent feeder wiring shall be connected to the grounding bus in the distribution panelboard or disconnecting means.

(2) In the electrical system, all exposed metal parts, enclosures, frames, lamp fixture canopies, etc., shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard.

(3) Cord-connected appliances, such as washing machines, clothes dryers, refrigerators, and the electrical system of gas ranges, etc., shall be grounded by means of an approved cord with grounding conductor and grounding-type attachment plug.

(d) *Bonding of Noncurrent-Carrying Metal Parts.* (1) All exposed noncurrent-carrying metal parts that may become energized shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor shall be connected between each distribution panelboard and an accessible terminal on the chassis.

(2) Grounding terminals shall be of the solderless type and approved as pressure-terminal connectors recognized for the wire size used. The bonding conductor shall be solid or stranded, insulated or bare and shall be No. 8 copper minimum, or equal. The bonding conductor shall be routed so as not to be exposed to physical damage. Protection can be afforded by the configuration of the chassis.

(3) Metallic gas, water and waste pipes and metallic air-circulating ducts shall be considered bonded if they are connected to the terminal on the chassis (see 1426.090(d)(1)) by clamps, solderless connectors, or by suitable grounding-type straps.

(4) Any metallic roof and exterior covering shall be considered bonded if (i) the metal panels overlap one another and are security attached to the wood or metal frame parts by metallic fasteners, and (ii) if the lower panel of the metallic exterior covering is secured by metallic fasteners at a cross member of the chassis by two metal straps per mobile home unit or section at opposite ends. The bonding strap material shall be a minimum of 4 inches in width of material equivalent to the skin or a material of equal or better electrical conductivity. The straps shall be fastened with paint-pentrating fittings (such as screws and starwashers or equivalent).

§ 1426.100 Electrical testing.

(a) *Dielectric Strength Test.* The wiring of each mobile home shall be subjected to a 1-minute, 900-volt dielectric strength test (with all switches closed) between live parts (including neutral) and the mobile home ground. Alternatively, the test may be performed at 1,080 volts for 1 second. This test shall be performed after branch circuits are complete and after fixtures or appliances are installed. Fixtures or appliances which are listed shall not be required to withstand the dielectric strength test.

§ 1426.110 Calculations.

(a)(1) The following method shall be employed in computing the supply-cord and distribution-panelboard load for each feeder assembly for each mobile home and shall be based on a 3-wire, 115/230-volt supply with 115-volt loads balanced between the two legs of the 3-wire system.

METHOD NO. 1

A. Lighting and Small Appliance Load.

Lighting Watts: Length times width of mobile home (outside dimensions, exclusive of coupler) times 3 watts per square foot; e.g., Length x width x 3 = ____ lighting watts.

Small Appliance Watts: Number of circuits times 1,500 watts for each 20-ampere appliance receptacle circuit (see definition of "Appliance, Portable" with note); e.g., Numbers of circuits x 1,500 = ____ small appliance watts.

Total Watts: Lighting watts plus small appliance = ____ total watts.

First 3,000 total watts at 100 percent plus remainder at 35 percent = ____ watts to be divided by 230 volts to obtain current (amperes) per leg.

B. Total load for determining power supply is the summation of: (1) Lighting and small appliance load as calculated above. above.

(2) Nameplate amperes for motors and heater loads (exhaust fans, air conditioners, electric, gas, or oil heating). Omit smaller of these two except include blower motor if used as air conditioner evaporator motor. When an air conditioner is not installed and a 40-ampere power supply cord is provided, allow 15 amperes per leg for air conditioning.

(3) 25 percent of current of largest motor in (2).

(4) Total of nameplate amperes for: disposal, dishwasher, water heater, clothes dryer, wall-mounted oven, cooking units.

Where number of these appliances exceeds three, use 75 percent of total.

(5) Derive amperes for free-standing range (as distinguished from separate ovens and cooking units) by dividing values below by 230 volts.

Nameplate rating (in watts):	*Use (in watts)*
10,000 X or less	80 percent of rating.
10,001 to 12,500	8,000.
12,501 to 13,500	8,400.
13,501 to 14,500	8,800.
14,501 to 15,500	9,200.
15,501 to 16,500	9,600.
16,501 to 17,500	10,000.

(6) If outlets or circuits are provided for other than factory-installed appliances include the anticipated load. The following example is given to illustrate the application of this Method of Calculation:

Example. A mobile home is 70 x 10 feet and has two portable appliance circuits, a 1000 watt 230 volt heater, a 200 watt 115 volt exhaust fan, a 400 watt 115 volt dishwasher and a 7000 watt electric range.

Lighting and small appliance load:	*Watts*
Lighting 70×10×3	2,100
Small appliance 1,500×2	3,000
Total	5,100
First 3,000 W at 100 percent	3,000
Remainder (5,100−3,000=2,100) at 35 percent	735
Total	3,735

NOTE.—See below:

$$\frac{3,735}{230}=16 \text{ A per leg}$$

1,000 W (heater)÷230=4.4 A.
200 W (fan)÷115=1.7 A.
400 W (dishwasher)÷115=3.5 A.
7,000 W (range)×0.8÷230=24.0 A.

	Amperes per leg	
	A	B
Lighting and appliances	16	16
Heater (230 V)	4	4
Fan (115 V)	2	
Dishwasher (115 V)		4
Range	24	24
Totals	46	48

NOTE.—Based on the higher current calculated for either leg, use one 50-ampere supply cord.

METHOD NO. 2

C. Optional Method of Calculation for Lighting and Appliance Loads. For mobile homes served by a single 3-wire 115/230-volt set of feeder conductors with an ampacity of 100 or greater, the total load for determining the feeder ampacity may be computed in accordance with the following Table instead of the method previously specified. Feeder conductors whose demand load is determined by this optional calculation shall be permitted to have the neutral load determined by section 220-222 of the National Electrical Code in the Table as "other load" and as "Remainder of other load" shall include the following.

(1) 1500 watts for each 2-wire, 20-ampere small appliance branch circuit and each laundry branch circuit specified.

(2) 3 watts per square foot for general lighting and general-use receptacles.

(3) The nameplate rating of all fixed appliances, ranges, wall-mounted ovens, counter-mounted cooking units, and including 4 or more separately controlled space heating units.

(4) The nameplate ampere or kVA rating of all motors and of all low-power-factor loads.

(5) The largest of the following: (i) Air conditioning load; (ii) the 65 percent diversified demand of the central electric space heating load; (iii) the 65 percent diversified demand of the load of less than four separately-controlled electric space heating units; (iv) the connected load of four or more separately-controlled electric space heating units.

OPTIONAL CALCULATION FOR MOBILE HOMES WITH 100-AMPERE OR LARGER SERVICE

Load (in kW or kVA):	*Demand factor (percent)*
Air conditioning and cooling, including heat pump compressors	100
Central electric space heating	65
Less than 4 separately controlled electric space heating units	65
First 10kW of all other load	100
Remainder of other load	40

§ 1426.120 Wiring of expandable units and dual units.

(a) Expandable or dual unit mobile homes shall use fixed-type wiring methods and materials for connecting such units to each other.

(b) Expandable or dual unit mobile homes not having permanently installed feeders and which are to be moved from one location to another, shall be permitted to have disconnecting means with branch circuit protective equipment in each unit when so located that after assembly or joining together of units the requirements of § 1426.030(1) will be met.

§ 1426.130 Outdoor outlets, fixtures, air-conditioning equipment, etc.

(a) Outdoor fixtures and equipment shall be recognized for outdoor use. Outdoor receptacles or convenience outlets shall be of a gasketed-cover type.

(b) A mobile home provided with a receptacle outlet designed to energize heating and/or air conditioning equipment located outside the mobile home, shall have permanently affixed, adjacent to the outlet receptacle, a metal tag which reads:

This Connection Is for Air Conditioning Equipment Rated at Not More Than ---- Amperes, at ---- Volts, 60 Hertz.

The correct voltage and ampere ratings shall be given. The tag shall be not less than 0.020 inch, etched brass, stainless steel, anodized or alclad aluminum or equivalent. The tag shall be not less than 3 inches by 1¾ inches minimum size.

§ 1426.140 Painting of wiring.

During painting or staining of the mobile home, it shall be permitted to paint metal raceways (except where grounding continuity would be reduced) or the sheath of the nonmetallic cable. Some arrangement, however, shall be made so that no paint shall be applied to the individual wires, as the color coding may be obliterated by the paint.

§ 1426.150 Polarization.

(a) The identified (white) conductor shall be employed for grounded circuit conductors only and shall be connected to the identified (white) terminal or lead on receptacle outlets and fixtures. It shall be the unswitched wire in switched circuits, except that a cable containing an identified conductor (white) shall be permitted for single-pole three-way or four-way switch loops where the connections are made so that the unidentified conductor is the return conductor from the switch to the outlet. Painting of the terminal end of the wire shall not be required.

(b) If the identified (white) conductor of a cable is used for other than grounding conductors or for other than switch loops as explained above (for a 230-volt circuit, for example), the conductor shall be finished in a color other than white at each outlet where the conductors are visible and accessible.

(c) Green-colored wires or green with yellow stripe shall be used for grounding conductors only.

§ 1426.160 Examination of equipment for safety.

The examination or inspection of equipment for safety, according to this standard, shall be conducted under uniform conditions and by organizations properly equipped and qualified for experimental testing, inspections of the run of goods at factories, and service-value determinations through field examinations.

Subpart H—Transportation

§ 1427.010 Scope.

This Subpart H of this Standard covers (a) the general requirement for designing the structure of the mobile home to fully withstand the adverse effects of transportation shock and vibration without degradation of the integrated structure or of its component parts; (b) the specific requirements pertaining to the transportation system and its relationship to the structure.

§ 1427.020 Definitions.

(a) "Chassis" means the entire transportation system comprising the following subsystems: Drawbar and coupling mechanism, frame, running gear assembly, and lights.

(b) "Drawbar and Coupling Mechanism" means the rigid assembly, (usually an "A" frame) upon which is mounted a coupling mechanism, which connects the mobile home's frame to the towing vehicle.

(c) "Frame" means the fabricated rigid substructure which provides considerable support to the affixed mobile home structure both during transport and on-site; and also provides a platform for securement of the running gear assembly, the drawbar and coupling mechanism.

(d) "Running Gear Assembly" means the subsystem consisting of suspension springs, axles, bearings, wheels, hubs, tires, and brakes, with their related hardware.

(e) "Lights" means those safety lights and associated wiring required by applicable U.S. Department of Transportation regulations.

(f) "Transportation System," (Same as Chassis, above).

(g) "Highway," includes all roads and streets to be legally used in transporting the mobile home.

§ 1427.030 General requirements for designing the structure to withstand transportation shock and vibration.

(a) The cumulative effect of highway transportation shock and vibration upon a mobile home structure may result in incremental degradation of its designed performance in terms of providing a safe, healthy and durable dwelling. Therefore, the mobile home shall be designed, in terms of its structural, plumbing, mechanical and electrical systems, to fully withstand such transportation forces during its intended life. (See §§ 1423.030 (c) and 1423.050(a)).

(b) Particular attention shall be given to maintaining watertight integrity and conserving energy by assuring that structural components in the roof and walls (and their interfaces with vents, windows, doors, etc.) are capable of resisting highway shock and vibration forces during primary and subsequent secondary transportation moves.

§ 1427.040 Specific requirements for designing the transportation system.

(a) General. The entire system (frame, drawbar and coupling mechanism, running gear assembly, and lights) shall be designed and constructed as an integrated, balanced and durable unit which is safe and suitable for its specified use during the intended life of the mobile home. In operation, the transportation system (supporting the mobile home structure and its contents) shall effectively respond to the control of the towing vehicle in terms of tracking and braking, while traveling at applicable highway speeds and in normal highway traffic conditions.

NOTE.—While the majority of mobile homes utilize a fabricated steel frame assembly, upon which the mobile home structure is constructed, it is not the intent of this standard to limit innovation. Therefore, other concepts, such as integrating the frame function into the mobile home structure, are acceptable: *Provided*, That such design meets the intent and requirements of this subpart.

(b) *Specific requirements*—(1) *Drawbar*. The drawbar shall be constructed of sufficient strength, rigidity and durability in order to safely withstand those dynamic forces experienced during highway transportation. It shall be securely fastened to the mobile home frame by either a continuous weld or by bolting.

(2) *Coupling Mechanism*. The coupling mechanism (which is usually of the socket type) shall be securely fastened to the drawbar in such a manner as to assure safe and effective transfer of the maximum loads, including dynamic loads, between the mobile home structure and the hitch-assembly of the towing vehicle. The coupling shall be equipped with a manually operated mechanism so adapted as to prevent disengagement of the unit while in operation. The coupling shall be so designed that it can be disconnected regardless of the angle of the mobile home to the towing vehicle. With the mobile home parked on level ground, the center of the socket of the coupler shall not be less than 20 inches nor more than 26 inches from ground level.

(3) *Chassis*. The chassis, in conjunction with the mobile home structure, shall be designed and constructed to effectively sustain the designed loads consisting of the dead load plus a minimum of 3 pounds per square foot floor load, (example: Free-standing range, refrigerator, and loose furniture) and the superimposed dynamic load resulting from highway movement but shall not be required to exceed twice the dead load. The integrated design shall be capable of insuring rigidity and structural integrity of the complete mobile home structure and to insure against deformation during its intended life.

(4) *Running Gear Assembly*. The running gear assembly, as part of the chassis, shall be designed to perform, as a balanced system, in order to effectively sustain the designed loads set forth in § 1427.040(b)(3) and to provide for durable dependable safe mobility of the mobile home. It shall be designed to accept shock and vibration, both from the highway and the towing vehicle and effectively dampen these forces so as to protect the mobile home structure from damage and fatigue. Its components shall be designed to facilitate routine maintenance, inspection and replacement. Location of the running gear assembly shall be determined by documented engineering analysis, taking into account the gross weight (including all contents), total length of the mobile home, the necessary coupling hitch weight, span distance, and turning radius. The coupling weight shall be not less than 12 percent nor more than 25 percent of the gross weight. In place of the engineering analysis, the manufacturer of the mobile home may provide acceptable documented data of suitable road-tests which were conducted to simulate transportation loads and conditions.

(5) *Spring Assemblies*. Spring assemblies (springs, hangers, shackles, bushings and mounting bolts) shall be capable of withstanding all the design loads as outlined in § 1427.040(b)(3) without exceeding maximum allowable stresses specified in the current Society of Automotive Engineers (SAE) Handbook. The capacity of the spring system shall assure, that under maximum operating load conditions, sufficient clearance shall be maintained between the tire and mobile home frame or structure to permit unimpeded wheel movement and for changing tires.

(6) *Axles*. Axles, and their connecting hardware, shall be capable of withstanding all of the design loans outlined in § 1427.040(b)(3) without exceeding maximum allowable stresses for design axle life as recommended by the axle manufacturer. The number of axles required to provides a safe tow with good ride characteristics shall be determined and documented by engineering analysis or by documented suitable road-tests which simulate actual transportation loads and conditions.

(7) *Hubs and Bearings*. Hubs and bearings shall meet the requirements of § 1427.040(b)(3) and good engineering practice. Both of these components shall be accessible for inspection, routine maintenance and replacement of parts.

(8) *Tires, Wheels and Rims*. Tires, wheels and rims shall meet the requirements of § 1427.040(b)(3) and the applicable U.S. Department of Transportation Regulation (Fed. Std. #120, effective Sept. 1, 1975). Tires shall be selected for anticipated usage.

(9) *Brake Assemblies*. The number, type, size and design of brake assemblies required to assist the towing vehicle in providing effective control and stopping of the mobile home shall be determined and documented by engineering analysis or by suitable, documented road tests which simulate actual transportation loads and conditions. Brakes on the towing vehicle and the mobile home shall be capable of assuring that the maximum stopping distance from an initial velocity of 20 miles per hour does not exceed 40 feet (U.S. Department of Transportation Regulations).

(10) *Lights and Associated Wiring*. Highway safety electrical lights and associated wiring shall conform to applicable federal requirements in terms of location and performance. The manufacturer shall have the option of meeting this requirement by utilizing a temporary light/wiring harness provided by the mobile home transportation carrier.

Issued at Washington, D.C., June 17, 1975.

DAVID M. DEWILDE,
Acting Assistant Secretary-Commissioner, Housing Production and Mortgage Credit.

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Secretary

■

FEDERALLY OWNED AND FEDERALLY ASSISTED HOUSING

Lead Base Paint Poisoning Prevention

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Secretary

[24 CFR Part 35]

[Docket No. R-75-339]

LEAD BASED PAINT POISONING PREVENTION IN FEDERALLY OWNED AND FEDERALLY ASSISTED HOUSING

Proposed Rulemaking

Notice is hereby given that the Department of Housing and Urban Development proposes to revise its existing regulations to implement the provisions of section 302 of the Lead Based Paint Poisoning Prevention Act, Pub. L. 93-151, 42 U.S.C. 4801 et seq.

Since the enactment of Pub. L. 93-151, November 9, 1973, which amended the Lead Based Paint Poisoning Prevention Act, 42 U.S.C. 4801, HUD has been engaged in an ongoing effort to clarify the complex issues related to lead based paint poisoning to determine the most cost-effective and practical methods to best effectuate the Congressional purpose and intent as expressed in section 302 of the Act. To this end, the Department has developed a broad program for addressing the threat that lead poisoning poses to the life and safety of children.

In addition to earlier regulations prohibiting the use of lead based paint in HUD-associated properties pursuant to the 1971 Act, HUD had administratively initiated regulations pertaining to the elimination of lead based paint hazards, 24 CFR Part 35, prior to the enactment of Pub. L. 93-151. To assist in its evaluation of these regulations in light of the amendments to the 1971 Act, HUD held four days of public hearings, May 20-23, 1974 for the purpose of obtaining information relating to the causes, treatment and elimination of lead poisoning.

Written comments and testimony at the hearings covered the full spectrum of technical opinions and advice of health experts, tenants, environmental specialists, engineers, real estate brokers, landlords, homeowners, State and local officials, representatives from chemical laboratories, and representatives of paint manufacturers. A variety of points of view were expressed in the testimony with respect to the nature, source and solution to the problem. While there appeared to be agreement that lead based paint probably is the most serious source of poisoning, there was also considerable testimony regarding the relative importance of other sources of lead poisoning such as dust, dirt, gasoline and other pollutants as well as socio-economic factors which are important contributing agents to lead poisoning found in children. There were differences of opinion as to what amount of lead in the blood constitutes a hazard.

The hearings were recorded and a transcript of the record and copies of the written comments are available to the public during regular office hours in Room 8141, Department of Housing and Urban Development, 451 Seventh Street SW., Washington, D.C.

In discussing solutions to the problem, a number of experts have recommended that the focus of deleading activities should be on housing where children with elevated blood levels reside. This health approach would involve an initial screening of children to determine the blood lead level, the identification and treatment of children having an elevated blood lead level and a focus on deleading the specific homes in which such children reside. In contrast, a housing approach would involve a screening of all housing for lead based paint and removal of such paint where found irrespective of the age and blood lead level of the inhabitants or the age and condition of the housing. While completely removing all lead based paint from all housing would effectively eliminate one source of lead poisoning the cost involved would be very high. In addition, such costs would affect the value of the housing involved and could have the effect of substantially reducing the supply of otherwise standard housing available to low and moderate income families. It appears to the Department that, given the magnitude of the problem, a health approach would be the most effective and timely. By placing priority consideration on the children found to have elevated blood lead levels, greater protection would be available at the present time for those in greatest need.

Consistent with a health approach, there are numerous local programs supported by funds from the Department of Health, Education and Welfare's Childhood Lead Poisoning Control Program that test children for elevated blood lead levels and treat those who have potentially hazardous levels of lead in their blood. In addition to the specific project grant funds, Medicaid may be available to pay both for the screening and the treatment of children for those who cannot afford it (the Medicaid eligible population). Deleading of properties where children are endangered is primarily the responsibility of the owner/landlord. HEW project funds, however, may be available on a limited basis to cover the necessary hazard abatement costs.

During the period of HUD's evaluation of the problem, the Department instituted interim procedures for alerting all residents in older HUD-associated properties to the potential hazards of lead based paint. HUD requires that all purchasers and tenants of HUD-associated properties constructed prior to 1950 be notified that such potential hazards may be present. Such purchasers and tenants must be informed of the symptoms of lead poisoning and the precautions to be taken to avoid poisoning.

Until the last few years, there had been very limited information available on the medical, environmental and technological nature of lead poisoning—its cause, treatment and prevention. Because of the complex nature of the problem, a comprehensive research program has been instituted. Cost-effective solutions to lead poisoning and hazard prevention are highly sensitive to technological developments. Consequently, research is a critical element in addressing the problem. HUD's research effort has been directed toward understanding the nature and extent of lead based paint in lead poisoning and toward the development of improved methods for the detection and elimination of lead based paint hazards. HUD is seeking the ideas and suggestions of interested and expert parties in meeting these goals.

In 1974, HUD substantially expanded the research and demonstration program which was initiated in 1972. Early research projects conducted through the National Bureau of Standards assessed the magnitude of the problem and the technology available for detecting and mitigating lead hazards. These initial research projects resulted in 24 research reports providing essential baseline information on which the current much expanded research and development program is based. These reports are available to the public through the National Technical Information Service.

An extensive program of immediate and long range objectives has been established. These include, in cooperation with other Federal agencies, a program to identify all sources of lead poisoning and to quantify the contribution of each source, including lead based paint. It has been determined, through research and from evidence given by experts at the public hearings, that lead based paint is only one source of lead in the environment, although present indications point to it as a serious source. It remains unclear, however, to what extent lead based paint or other sources, such as dust, dirt, gasoline and other pollutive substances, contribute to the total incidence of lead in the environment and to what extent each is a contributing factor in lead poisoning in children. In cooperation with the Environmental Protection Agency, the National Science Foundation and the National Institutes of Health, the HUD lead based research program has undertaken a series of projects to understand the sources and causes of undue lead ingestion.

Utilizing data from HEW funded and other local programs and HUD surveys, HUD is attempting to develop a basis for establishing a national standard for determining what level of lead based paint on surfaces constitutes a hazard. In this connection, research programs are seeking to develop a less costly and more sensitive method for detecting the presence of lead based paint. Present methods are either very time consuming and inefficient or unreliable. Contracts have been awarded to firms to develop improved methods for the inexpensive, reliable detection of low levels of lead based paint on walls.

Further, HUD is seeking to develop more efficient and cost-effective methods for eliminating lead based paint hazards. Major activities include the following: A four city experimental program to test existing technology; development of new technologies, i.e., the testing of acerbic (bad tasting) points and encouragement for private industry doing research in this field; and development of program strategies by which state and local governments can combat lead poisoning in the most effective manner. Jointly with HEW, the HUD research program is funding local demonstration programs to improve local program management, to effectively combine health and housing strategies in alleviating lead poisoning and to mobilize local resources for the long-term funding of lead poisoning control programs. HUD is also establishing a clearinghouse to provide for the rapid dissemination of the results of HUD research to the various user groups. We anticipate that this research effort will provide medical and technical solutions to effectively address this serious childhood disease. Interested parties are requested to send research suggestions to the Lead Based Paint Research Program, Room 8136, Office of Policy Development and Research, Department of Housing and Urban Development, 451 Seventh Street, SW., Washington, D.C. 20410.

In evaluating the current administrative policies and procedures, HUD has given careful consideration to the following: information received at the public hearings; the reports of the HUD research and development programs; the anticipated results of the short- and long-term research programs; the impact of alternative solutions on the supply of housing for low and moderate income families; the limitation of HUD's authority to deal with this complex national housing stock which is under the jurisdiction of this Department; and the costs involved for the benefits to be derived.

In light of these considerations, HUD proposes to revise Part 35. The proposed regulations will be subject to a continuing evaluation and review by HUD for the purpose of further modification and revision as new information becomes available through the ongoing medical and technological research programs. The proposed regulations include the following: a new Subpart A entitled Notification to Purchasers and Tenants of HUD-Associated Housing Constructed Prior to 1950 of the Hazards of Lead Based Paint Poisoning; a new Subpart B entitled Prohibition Against the Use of Lead Based Paint in HUD-Associated Housing; a new Subpart C entitled Elimination of Lead Based Paint Hazards in HUD-Associated Housing; a new Subpart D entitled Local Codes and Regulations; and a new Subpart E entitled Elimination of Lead Based Paint Hazards in Federally Owned Housing.

The new Subpart A implements the provision of the Act regarding notification to purchasers and tenants of the hazards of lead based paint in housing constructed prior to 1950 and administratively, expands its application to all HUD-Associated housing.

The new Subpart E implements the provision of the Act authorizing the Secretary to establish and implement procedures to eliminate the hazards of lead based paint in all federally-owned properties prior to sale when their use is intended for residential habitation. This Subpart is applicable to all properties owned by Federal agencies when sold by such agencies for residential habitation and directs such agencies to inspect for and eliminate immediate hazards of paints which may contain lead in such properties.

The Subparts, designated B, C and D modify the existing requirements and procedures in the current Subparts A and B of 24 CFR Part 35. The definition of "lead based paint" is revised. The definition of "health hazards" is deleted and a definition of "immediate hazards" substituted.

Interested parties are invited to submit written comments, suggestions, and amendments concerning the new procedures, requirements and notification brochures (appendix I) by 1975, comments should refer to Docket No. 339 and should be addressed to the Rules Docket Clerk, Office of the General Counsel, Rom 10245, Department of Housing and Urban Development, 451 Seventh Street, SW., Washington, D.C. 20410. All relevant material received by July 21, 1975, will be considered before adoption of a final rule and HUD will make such modifications in these proposed regulations are are deemed appropriate. A copy of each communication will be available for public inspection during regular business hours at the above address. A draft environmental impact statement pursuant to the National Environmental Policy Act of 1969 has been prepared and is being circulated for public comment with respect to these regulations. A copy of the draft environmental impact statement is available for public inspection during regular business hours in the Office of the Rules Docket Clerk, Room 10245, U.S. Department of Housing and Urban Development, and in the Information Centers of HUD's Regional Offices. The proposed revision of Part 35 is as follows:

Subpart A—Notification to Purchasers and Tenants of HUD-Associated Housing Constructed Prior to 1950 of the Hazards of Lead Based Paint Poisoning

Sec.
35.1 Purpose and scope.
35.3 Definitions.
35.5 Requirements.

Subpart B—Prohibition Against the Use of Lead Based Paint in HUD-Associated Housing

35.10 Purpose and scope.
35.12 Definitions.
35.14 Requirements.

Subpart C—Elimination of Lead Based Paint Hazards in HUD-Associated Housing

35.20 Purpose and scope.
35.22 Definitions.
35.24 Requirements.

Subpart D—Local Codes and Regulations

35.40 Purpose and scope.
35.42 Requirements.

Subpart E—Elimination of Lead Based Paint Hazards in Federally Owned Properties Prior to Sale for Residential Habitation

35.50 Purpose and scope.
35.52 Applicability.
35.54 Definitions.
35.56 Requirements.

AUTHORITY: Pub. L. 91-695, 84 Stat. 2079, as amended by Pub. L. 93-151, 42 U.S.C. 4801 et seq.

Subpart A—Notification to Purchasers and Tenants of HUD-Associated Housing Constructed Prior to 1950 of the Hazards of Lead Based Paint Poisoning

§ 35.1 Purpose and scope.

This Subpart A establishes procedures to assure that purchasers and tenants of all HUD-associated housing constructed prior to 1950 are notified of the hazards of lead based paint which may exist in such housing, of the symptoms and treatment of lead based paint poisoning and of the precautions to be taken to avoid lead based paint poisoning.

§ 35.3 Definitions.

For the purposes of this subpart, the following definitions are applicable:

(a) "Act" means the Lead Based Paint Poisoning Prevention Act, Pub. L. 91-695, 84 Stat. 2079, as amended by Pub. L. 93-151, 42 U.S.C. 4801 et seq.

(b) "Department" or "HUD" means the Department of Housing and Urban Development.

(c) "Secretary" means the Secretary of the Department of Housing and Urban Development or a HUD official delegated the Secretary's authority with respect to the Act.

(d) "Assistant Secretaries" means the Assistant Secretaries of the Department of Housing and Urban Development.

(e) "HUD-associated housing" means any residential structure as defined in subsection (f) below, which is HUD-owned or financially assisted under any programs administered by the Secretary when such structures are being constructed, sold, purchased, leased, rehabilitated (including routine maintenance work), modernized or improved with any form of HUD financial assistance whether by grant, loan, advance, housing assistance payments, the proceeds of a HUD-guaranteed loan or a HUD-insured mortgage.

(f) "Residential structure" means any house, apartment or structure intended for human habitation, including any institutional structure where persons reside, such as an orphanage, boarding school, dormitory, day care center, or extended care facilities, college housing, hospitals, group practice facilities and community facilities.

(g) "Applicable surfaces" means all interior surfaces and those exterior surfaces such as stairs, decks, porches, railings, windows and doors which are readily accessible to children under 7 years of age.

(h) "Potential hazard" means paint (which may contain lead) on applicable surfaces which is in a sound, tight condition, but which may become an immediate hazard, as defined in paragraph (i) of this section, by reason of cracking, chipping, scaling, peeling or loosening.

(i) "Immediate hazard" means paint or plaster (which may contain lead) on applicable surfaces which is cracking, scaling, chipping, peeling or loose.

(j) "Defective paint condition" means any paint on applicable surfaces which is cracking, scaling, chipping, peeling or loose.

§ 35.5 Requirements.

(a) Purchasers and tenants of HUD-associated housing constructed prior to 1950 shall be notified (1) that the property was constructed prior to 1950, (2) that the property may contain lead based paint, (3) of the potential and immediate hazards of lead based paint, (4) of the symptoms and treatment of lead based paint poisoning, and (5) of the precautions to be taken to avoid lead based paint poisoning (including maintenance and removal techniques for eliminating such hazards). Appendix 1, which is attached hereto and made a part hereof, consists of HUD brochures, copies of which shall be used to provide the required notification.

(b) Each Assistant Secretary shall take necessary actions to implement the requirements of paragraph (a) of this section with respect to the HUD programs within his administrative jurisdiction. Such actions shall include the establishment of procedures to (1) provide evidence that the information contained in the appropriate HUD brochures, Appendix I, has been received by purchasers and tenants of HUD-associated housing constructed prior to 1950, and (2) require the inclusion of appropriate provisions in contracts of sale, rental or management of HUD-associated housing to assure the receipt of the information contained in the appropriate HUD brochures by purchasers and tenants of such housing.

Subpart B—Prohibition Against the Use of Lead Based Paint in HUD-Associated Housing

§ 35.10 Purpose and scope.

This subpart implements the provisions of 42 CFR Part 90 which are applicable to Federal agencies and which prohibit the use of lead based paint in residential structures constructed or rehabilitated by the Federal Government or with Federal assistance and establishes procedures to prohibit the use of lead based paint to paint applicable surfaces in all HUD-associated housing.

§ 35.12 Definitions.

The definitions contained in § 35.3 of Subpart A of this part shall apply to this Subpart B and in addition the following definition is applicable to this Subpart B:

(a) "Lead Based Paint" as defined in section 501(3) of the Act means any paint containing more than five-tenths of 1 per centum lead by weight (calculated as lead metal) in the total nonvolatile content of liquid paints or in the dried film of paint.

§ 35.14 Requirements.

(a) No office of the Department shall use or permit the use of lead based paint to paint applicable surfaces of HUD-associated housing.

(b) Each Assistant Secretary shall implement the requirements of paragraph (a) of this section with respect to the HUD programs within his administrative jurisdiction. Implementation shall include the establishment of procedures to require the inclusion of appropriate provisions in contracts and subcontracts involving HUD-associated housing prohibiting the use of lead based paint to paint applicable surfaces of such HUD-associated housing and shall include provisions necessary for enforcement of the prohibition.

Subpart C—Elimination of Lead Based Paint Hazards in HUD-Associated Housing

§ 35.20 Purpose and scope.

This Subpart C implements the provisions of section 302 of the Act with respect to establishing procedures to eliminate as far as practicable the hazards due to the presence of paint which may contain lead on applicable surfaces of HUD-associated housing.

§ 35.22 Definitions.

The definitions contained in § 35.3 shall apply to this Subpart C.

§ 35.24 Requirements.

(a) Prior to the occupancy of HUD-associated housing, immediate hazards shall be eliminated by the most practicable means. For this purpose, all defective paint conditions shall be assumed to be immediate hazards.

(b) Each Assistant Secretary shall implement or provide for the implementation of the requirements of paragraph (a) of this section with respect to HUD programs within his administrative jurisdiction. Implementation shall include the following:

(1) HUD-associated housing shall be inspected to determine whether or not immediate hazards exist. Responsibility for such inspections shall be as follows:

(i) HUD-owned housing that is to be rehabilitated before sale shall be inspected by local HUD staff or, if appropriate, by the property manager as part of the program for management and disposition of HUD-owned property;

(ii) HUD-owned property that is to be sold in an as-is condition shall be inspected by the local HUD staff or by the property manager as part of the program for management and disposition of HUD-owned property prior to the sale of such property or subsequent to the sale but prior to occupancy thereof for residential use; provided, however, that where properties are conveyed to a unit of State or local government, the state or local government body shall be responsible for inspection.

(iii) HUD-owned property that is rented or leased for residential use or will be offered for such rental shall be inspected by the local HUD staff or by the property manager as part of the program for management and disposition of HUD-owned properties.

(iv) Existing housing proposed for HUD-FHA mortgage insurance shall be inspected by the local HUD staff or by fee appraisers where otherwise permitted under existing procedures;

(v) Low-income public housing (including occupied units) shall be inspected by the local housing authority, local public agency or other agent responsible for the maintenance, management, repair and operation of such housing;

(vi) In the rehabilitation of HUD-associated college housing, the architect shall be responsible for inspection of the premises;

(vii) In housing assisted with Community Development funds, the appropriate local public agency, local public body, city demonstration agency or unit of local government or agency thereof shall be responsible for inspection of the premises;

(2) Notwithstanding the requirements of paragraph (b)(1) of this section in the section 8 Housing Assistance Payment Program, the owner shall be responsible for providing certification to the local HUD staff, the local public housing agency or the state finance agency that the property has been treated in accordance with the applicable provisions of Parts 881, 882 and 883 of Chapter VIII of this Title 24.

(3) Treatment to eliminate such immediate hazards as a minimum shall consist of the following:

(i) All surface conditions identified as immediate hazards shall be thoroughly cleaned (washed, sanded, scraped, wire brushed or otherwise cleaned) so as to remove all cracking, scaling, peeling, chipping and loose paint on applicable surfaces and then the surfaces that have been so treated shall be repainted with two coats of a suitable paint in accordance with the requirements of § 35.15; or

(ii) Where the paint film integrity of the applicable surface cannot be maintained, the paint shall be completely removed or the surface recovered with a suitable material such as hardboard, plywood, drywall or plaster before any repainting is undertaken; and

(4) Appropriate provisions for the inspection and elimination of immediate hazards and provisions necessary for enforcement of the requirements shall be included in contracts and subcontracts involving HUD-associated housing.

Subpart D—Local Codes and Regulations

§ 35.40 Purpose and scope.

The Department does not intend that anything in the procedures established in this Part 35 shall be construed to mean that compliance with the HUD requirements with respect to HUD-associated properties shall relieve an owner or tenant of his responsibility for complying with local ordinances, codes and regulations pertaining to lead based paint, nor does the Department assume any responsibility with respect to inspecting, enforcing, interpreting or determining compliance with such local requirements, except that, as provided in section 506 of the Act, the Federal standard for lead in paint preempts any state or local laws or regulations.

§ 35.42 Requirements.

Each Assistant Secretary shall take necessary actions to implement the intent of § 35.40.

Subpart E—Elimination of Lead Based Paint Hazards in Federally Owned Properties Prior to Sale for Residential Habitation

§ 35.50 Purpose and scope.

This Subpart E implements the provisions of section 302 of the Act which authorizes the Secretary to establish and implement procedures to eliminate the hazards of lead based paint poisoning in all Federally owned properties prior to the sale of such properties when their use is intended for residential habitation.

§ 35.52 Applicability.

The requirements established by this Subpart E are applicable to all Federally owned properties prior to their sale by a Federal agency when their use is intended for residential habitation.

§ 35.54 Definitions.

The following are applicable to this Subpart E:

(a) "Federal agency" means the United States or any executive departments, independent establishments, administrative agencies and instrumentalities of the United States, including corporations in which all or substantially all of the stock is beneficially owned by the United States or by any of the foregoing departments, establishments, agencies or instrumentalities.

(b) "Federally owned properties" means any properties owned by a Federal Agency as defined in paragraph (a) of this section.

(c) "Act" means the Lead Based Paint Poisoning Prevention Act, Pub. L. 91-695, 84 Stat. 2079, as amended by Pub. L. 93-151, 42 U.S.C. 4801 et seq.

(d) "Residential structure" means any house, apartment or structure intended for human habitation, including any institutional structure where persons reside, such as an orphanage, dormitory, day care center, or extended care facilities, college housing and hospitals.

(e) "Applicable surfaces" means all interior surfaces and those exterior surfaces such as stairs, decks, porches, railings, windows and doors which are readily accessible to children under 7 years of age.

(f) "Immediate hazard" means paint or plaster (which may contain lead) on applicable surfaces which is cracking, scaling, chipping, peeling or loose.

(g) "Defective paint condition" means any paint on applicable surfaces which is cracking, scaling, chipping, peeling or loose.

(h) "Use for residential habitation" means the use of a property as a residential structure as defined in subsection (d) above.

§ 35.56 Requirements.

(a) Prior to sale of a Federally owned property where its use subsequent to sale is intended for residential habitation, the Federal agency selling the property shall take the following steps to eliminate hazards of lead based paint poisoning:

(1) Have the property inspected to determine whether is not immediate hazards exist and for this purpose all defective paint conditions shall be assumed to be immediate hazards; and

(2) Have the surface conditions identified as immediate hazards thoroughly cleaned (washed, sanded, scraped, wire brushed or otherwise cleaned) so as to remove all cracking, scaling, peeling, chipping and loose paint on applicable surfaces and then repainted with two coats of a suitable non-leaded paint; or

(3) Where the paint film integrity of the applicable surface cannot be maintained, the paint shall be completely removed or the surface recovered with a suitable material such as hardboard, plywood, drywall or plaster before repainting.

(b) The provisions of this Subpart E shall be binding upon all Federal Agencies as provided by section 302 of the Act; however nothing contained in this Part 35 shall preclude any other Federal Agencies from promulgating such procedures or additional requirements as may be necessary to implement the terms of the Act.

(Sec. 7(d), 42 U.S.C. 3535(d))

Issued at Washington, D.C., June 13, 1975.

CARLA A. HILLS,
Secretary of the Department of Housing and Urban Development.

APPENDIX 1—THE DANGER OF LEAD POISONING TO YOUR CHILD (FOR HOMEOWNERS)

PLEASE READ CAREFULLY

This housing or apartment was built before 1950. There is a possibility that it may contain lead paints. Lead paint is poisonous if eaten. Many children do eat lead based paint. When they do, they frequently become very sick. You as parents are in the best position to safeguard your child's health by preventing him or her from eating paint or paint chips. This pamphlet will answer some of your questions about how to know if your child has been eating lead paint and what to do about it.

What is Lead Poisoning? Lead poisoning is a health problem in this country. Thousands of children under 7 years of age are poisoned each year. Lead poisoning can be very dangerous. Children who eat lead can become mentally retarded, blind, paralyzed or even die. To protect children, the Department of Housing and Urban Development has prepared this notice to help you find the problem if it exists in your house, know if your child has been poisoned and know how to prevent both the problem and the sickness.

What Causes Lead Poisoning? Your child can be poisoned if he or she eats paint, dirt, or other non-food substances containing lead. The most common cause of lead poisoning is lead based paint. Young children put many things besides food in their mouths. When they do this often, doctors call the problem Pica. If the items which are frequently eaten or chewed have a lot of lead, your child can be poisoned.

How Can You Tell If Your Child Is Poisoned? Sometimes, there are no signs. Your child may have lead poisoning if he or she has stomach aches and vomiting, has headaches, loses appetite, is cranky, or frequently is too tired to play. All these symptoms can be signs of lead poisoning. Do not wait too long. If you see these signs in your child for more than a week, he or she should be tested for lead poisoning.

How Do You Get Your Child Tested for Lead Poisoning? If someone has seen your child eating paint chips or if you have observed any of the signs of lead poisoning you should have the child tested for lead poisoning as soon as possible. Because lead poisoning sometimes shows no signs or seems to be like other childhood diseases, blood tests are necessary. This is called screening your child for lead poisoning. These tests take a matter of minutes and can tell you if your child has eaten enough lead to harm him.

Your doctor, local clinic, hospital, or public health department can make these tests for you. There is often no charge for the test.

The Department of Health, Education and Welfare supports blood screening programs in many communities. Screening programs are operated by local health departments and are frequently located in older areas of cities because that is often where lead based paint is found. If you don't know whether a screening program exists in your area call your public health nurse or social worker at the local health department.

Under this screening procedure children are tested for lead even if they show no symptoms and no one has seen them eating paint. This screening approach has detected many lead poisoning cases which might otherwise have escaped notice. Testing in these organized screening programs is free of charge.

If there is no screening program in your city and you cannot afford the testing, Medicaid may pay for screening of children below 6 years of age. The Medicaid program also may pay for the screening of children over 6 years of age if your doctor says testing is necessary.

How Do You Get Treatment For Your Child? If your child is tested and the test shows a high level of lead in his blood, he must have medical treatment. Treatment takes the lead out of the blood. Your doctor, local clinic or hospital can treat your child. Medicaid or the local health department can pay for treatment. The Department of HEW also helps you to get medical help for your child through its assistance to local programs.

How Can You Prevent Your Child From Being Poisoned? The most important thing you can do is to stop your child from eating paint and other objects that may contain lead. If your child is old enough to understand, warn him or her against eating anything but food. Also be sure to tell the rest of your family and people who babysit for you to make sure that your young children do not eat paint.

Often children will eat things when they are bored or hungry. Children are safer when they have toys or activities to keep them busy. If your child is not eating properly, you may want to take him to a doctor or clinic to be examined.

If you have seen your child putting pieces of paint or plaster in his mouth or chewing on woodwork, you should take him to a doctor, clinic or local screening program as soon as you can. Remember, in the beginning stages of lead poisoning, a child may not really seem sick. *Do not wait for signs of poisoning.*

How Can You Prevent Lead Paint Dangers in Your House? In the past, lead based paint wak used often in housing. As a result, many older houses and apartments contain many layers of lead based paint on the inside and outside of the house or building. This paint was applied to walls, ceilings, woodwork and trim inside the house and to walls, porches, stairs, fences and garages on the outside.

When the old paint chips off or peels, or if children chew on woodwork or door edges, there is real danger. Children can get dangerous amounts of lead from eating small amounts of lead paint.

Preventative Maintenance. Keeping your home and apartment in good shape is one of the best ways to prevent lead paint poisoning.

What Should You Look For? Peeling and flaking paint inside of houses and apartments are the major causes of lead paint hazard. Water leaks from faulty plumbing or defective roofs or ceilings often causes paint to peel or flake. Quick repairs of these leaks can prevent future peeling paint and flaking plaster.

Most houses or apartments should be repainted every three to five years to prevent peeling paint. Any loose or flaking paint should be removed by scraping or brushing. Cracked walls should be replastered before new paint is applied.

What Can You Do Now? If your walls are cracking or peeling *now*, an immediate hazard from lead paint may exist.

There are some things you should do immediately:

Get a broom or stiff brush and remove all loose pieces of paint from walls, woodwork, and ceilings. Sweep up all the pieces of paint and plaster. Put them in a paper bag or wrap them in newspaper as soon as possible. Put the package in the trash can. *Be careful* not to leave paint chips on the floor and keep children away from the dust—it can be very dangerous to everyone.

Always keep the floor clear of loose bits of paint and plaster. Sweeping the floors is the simplest step you can take and the most important.

Children will pick loose paint off walls, so be extra careful about keeping the lower parts of walls free of loose paint.

As an emergency measure you can cover up the lower parts of walls with contact paper. Also, to protect your child, you can put contact paper or adhesive tape on woodwork that your child might chew. You can also move heavy furniture against walls with peeling paint.

If testing shows that your child has a lot of lead in his blood, the local health department may send someone to measure the lead paint in your home and may require treatment of lead paint hazards on walls and woodwork.

The standards for treatment of these lead hazards vary from city to city. *In such cases be sure to follow the directions and guidance of the local health department.*

Is Paint the Only Cause of Poisoning? No. A young child can get lead poisoning from eating a lot of non-food items which contain lead. Things to watch out for are dirt, newspapers, batteries, some pottery, and some furniture.

Even common household dust sometimes contains high levels of lead. Lead can collect in dust and soil after lead paint has weathered and fallen to the ground or after exposure to exhaust from automobiles which use leaded gasoline. Because lead in soil is often heaviest near busy streets, children should be discouraged from playing in dust and dirt near streets.

Caution your child against eating or chewing these non-food items. If any of the symptoms of lead poisoning occur, see that your child is tested as soon as possible.

APPENDIX 2—THE DANGER OF LEAD POISONING TO YOUR CHILD (FOR RENTERS)

PLEASE READ CAREFULLY

This housing or apartment was built before 1950. There is a possibility that it may contain lead paints. Lead paint is poisonous if eaten. Many children do eat lead based paint. When they do, they frequently become very sick. You as parents are in the best position to safeguard your child's health by preventing him or her from eating paint or paint chips. This pamphlet will answer some of your questions about how to know if your child has been eating lead paint and what to do about it.

What is Lead Poisoning? Lead poisoning is a health problem in this country. Thousands of children under 7 years of age are poisoned each year. Lead poisoning can be very dangerous. Children who eat lead can become mentally retarded, blind, paralyzed or even die. To protect children, the Department of Housing and Urban Development has prepared this notice to help you find the problem if it exists in your house, know if your child has been poisoned and know how to prevent both the problem and the sickness.

What Causes Lead Poisoning? Your child can be poisoned if he or she eats paint, dirt, or other non-food substances containing lead. The most common cause of lead poisoning is lead based paint. Young children put many things besides food in their mouths. When they do this often, doctors call the problem Pica. If the items which are frequently eaten or chewed have a lot of lead, your child can be poisoned.

How Can You Tell If Your Child Is Poisoned? Sometimes, there are no signs. Your child may have lead poisoning if he or she has stomach aches and vomiting, has headaches, loses appetite, is cranky, or frequently is to tired to play. All these symptoms can be signs of lead poisoning. Do not wait too long. If you see these signs in your child for more than a week, he or she should be tested for lead poisoning.

How Do You Get Your Child Tested for Lead Poisoning? If someone has seen your child eating paint chips or if you have observed any of the signs of lead poisoning you should have the child tested for lead poisoning as soon as possible. Because lead poisoning sometimes shows no signs or seems to be like other childhood diseases, blood tests are necessary. This is called screening your child for lead poisoning. These tests take a matter of minutes and can tell you if your child has eaten enough lead to harm him.

Your doctor, local clinic, hospital, or public health department can make these tests for you. There is often no charge for the test.

The Department of Health, Education, and Welfare supports blood screening programs in many communities. Screening programs are operated by local health departments and are frequently located in older areas of cities because that is often where lead based paint is found. If you don't know whether a screening program exists in your area call your public health nurse or social worker at the local health department.

Under this screening procedure children are tested for lead even if they show no symptoms and no one has seen them eating paint. This screening approach has detected many lead poisoning cases which might otherwise have escaped notice. Testing in these organized screening programs is free of charge.

If there is no screening program in your city and you cannot afford the testing, Medicaid may pay for screening of children below 6 years of age. The Medicaid program also may pay for the screening of children over 6 years of age if your doctor says testing is necessary.

How Do You Get Treatment For Your Child? If your child is tested and the test shows a high level of lead in his blood, he must have medical treatment. Treatment takes the lead out of the blood. Your doctor, local clinic or hospital can treat your child. Medicaid or the local health department can pay for treatment. The Department of HEW also helps you to get medical help for your child through its assistance to local programs.

How Can You Prevent Your Child from Being Poisoned? The most important thing you can do is to stop your child from eating paint and other objects that may contain lead. If your child is old enough to understand, warn him or her against eating anything but food. Also be sure to tell the rest of your family and people who babysit for you to make sure that your young children do not eat paint.

Often children will eat things when they are bored or hungry. Children are safer when they have toys or activities to keep them busy. If your child is not eating properly, you may want to take him to a doctor or clinic to be examined.

If you have seen your child putting pieces of paint or plaster in his mouth or chewing on woodwork, you should take him to a doctor, clinic or local screening program as soon as you can. Remember, in the beginning stages of lead poisoning, a child may not really seem sick. *Do not wait for signs of poisoning.*

How Can You Prevent Lead Paint Dangers in Your House? Preventive Maintenance—Keeping your home and apartment in good shape is one of the best ways to prevent lead paint poisoning.

What Should You Look For? Peeling and flaking paint inside of houses and apartments are the major causes of lead paint hazards. If you have peeling, flaking paint in your apartment, notify the management or landlord. Often flaking paint may be the result of plumbing leaks. Repair of these leaks may prevent future peeling or flaking.

Most apartments should be repainted every three to five years to prevent peeling paint. Therefore, it is important to cooperate with the management office when repainting time comes. If your apartment has not been repainted within this period of time, inform the management office, or resident manager or landlord.

What Can You Do Now? If your walls are cracking or peeling *now*, an immediate hazard from lead paint may exist.

There are some things you should do immediately.

Notify the management office or resident manager or landlord immediately.

Get a broom or stiff brush and remove all loose pieces of paint from walls, wodwork, and ceilings. Sweep up all the pieces of paint and plaster. Put them in a paper bag or wrap them in newspaper as soon as possible. Put the package in the trash can. *Be careful* not to leave paint chips on the floor and keep children away from the dust—it can be very dangerous to everyone.

Always keep the floor clear of loose bits of paint and plaster. Sweeping the floors is the simplest step you can take and the most important.

Children will pick loose paint off walls, so be extra careful about keeping the lower parts of walls free of loose paint.

As an emergency measure you can move heavy furniture against walls with peeling paint.

If testing shows that your child has a lot of lead in his blood, the local health department may send someone to measure the lead paint in your home and may require treatment of lead paint hazards on walls and woodwork. Often this work is messy and inconvenient. To protect your child it is important to cooperate with the workmen if they come to improve the lead.

Is Paint the Only Cause of Poisoning? No. A young child can get lead poisoning from eating a lot of non-food items which contain lead. Things to watch out for are dirt, newspapers, batteries, some pottery, and some furniture.

Even common household dust sometimes contains high levels of lead. Lead can collect in dust and soil after lead paint has weathered and fallen to the ground or after exposure to exhaust from automobiles which use leaded gasoline. Because lead in soil is often heaviest near busy streets, children should be discouraged from playing in dust and dirt near streets.

Caution your child against eating or chewing these non-food items. If any of the symptoms of lead poisoning occur, see that your child is tested as soon as possible.

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